KANNUR UNIVERSITY

(Abstract)

B.Sc Plant Science Programme-Scheme & Syllabus of Core Courses under Choice Based Credit Semester System for Under Graduate Programme-implemented with effect from 2009 admission-Orders Issued.

ACADEMIC BRANCH

U.O.No.Acad/C2/2471/2007(2) Dated, K.U.Campus. P.O ,08- 07-2009.

Read: 1.Minutes of the meeting of the Board of Studies in Botany (UG) held on 27-05-2009.

2. Minutes of the meeting of the Faculty of Science held on 16-06-2009.

3. U.O No.Acad/C2/3838/2008 (i) dated 07-07-2009

4. Letter dated 29-06-2009 from the Chairman, BOS in Botany (UG).

ORDER

1.The Board of Studies in Botany(UG) vide paper read(1) above has prepared finalised and recommended the Scheme and Syllabus of Plant Science Core Courses under Choice Based Credit Semester System for implementation from 2009 admission.

2. The recommendations of the Board in restructuring the syllabus is considered by the Faculty of Science vide paper read (2) and recommended for the approval of the Academic Council.

3. The Regulations for Choice based Credit Semester System is implemented in this University vide paper read (3).

4. The Chairman, BOS in Botany (UG) vide paper read (4),forwarded the restructured scheme and syllabus of Plant Science Core Courses under Choice Based Credit Semester System, prepared by the Board of Studies in Botany(UG) for implementation with effect from 2009 admission.

5. The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction ***to implement the scheme and syllabus of Plant Science Core Courses restructured in line with Choice Based Credit Semester System, with effect from 2009 admission,*** subject to ratification by the Academic Council.

6. The restructured scheme and syllabus of Plant Science Core Courses under Choice Based Credit Semester System, implemented with effect from 2009 admission is appended.

7. The Scheme and Syllabus of Complementary Courses offered for this Programme will be available along with the syllabus of Core Courses of the Complementary subject.

8. The affiliated Colleges are not permitted to offer Complementary Courses in violation to the provisional/permanent affiliation granted by the University. Changes in Complementary Courses are permitted with prior sanction /revision in the affiliation order already issued in this regard.

9. If there is any inconsistency between the Regulations for CCSS and its application to the Scheme & Syllabus prepared, the former shall prevail.

10. Orders are issued accordingly.

Sd/-

To: REGISTRAR

1. The Principals of Colleges offering B.Sc Plant Science Programme.
2. The Examination Branch (through PA to CE)

Copy To:

1. The Chairman, BOS Botany (UG) Forwarded/By Order
2. PS to VC/PA to PVC/PA to Regr
3. DR/AR I Academic
4. Central Library
5. SF/DF/FC. SECTION OFFICER

Appendix to U.O No Acad/C2/2471/2007(2) dated 08-07-2009.

K A N N U R U N I V E R S I T Y

Course Structure

and

Syllabus

FOR

UNDERGRADUATE PROGRAMME

IN

PLANT SCIENCE

UNDER

CHOICE BASED CREDIT SEMESTER SYSTEM

w.e.f 2009 ADMISSION

Board of Studies in Botany (UG) Kannur University

Course Structure
B.Sc Plant Science

SEMESTER 1

No	Title of the Course	Hours /week	Credits	Exam hrs
1	Common Course (English)	5	4	3
2	Common Course (English)	4	3	3
3	Common Course (Additional Language)	5	4	3
4	Common Course (General)	4	4	2
5	Common Course (General) Practical	1	*	*
6	Complementary 1 (Course I)	4	3	3
7	Complementary 2 (Course I)	4	3	3

SEMESTER 2

No	Title of the Course	Hours/week	Credits	Exam hrs
1	Common Course (English)	5	4	3
2	Common Course (English)	4	3	3
3	Common Course (Additional Language)	5	4	3
4	Core Course 1	2	2	2
5	Core Course Practical	1	*	*
6	Complementary 1 (Course II)	4	3	3
7	Complementary 2 (Course II)	4	3	3

SEMESTER 3

No	Title of the Course	Hours/week	Credits	Exam hrs
1	Common Course (General)	5	4	3
2	Common Course (General)	5	4	3
3	Core Course 2	3	2	3
4	Core Course Practical	2	*	*
4	Complementary 1 (Course III)	5	3	3
5	Complementary 2 (Course III)	5	3	3

SEMESTER 4

No	Title of the Course	Hours/week	Credits	Exam hrs
1	Common Course (General)	5	4	3
2	Core Course 4	3	3	3
3	Core Course Practical	2	*	3
4	Core Course 5			
5	Complementary 1 (Course IV)	5	3	3
6	Complementary 2 (Course IV)	5	3	3

SEMESTER 5

No	Title of the Course	Hours / week	Credit	Exam hrs
1	Open Course 1	2	2	3
2	Core Course 5	3	2	3
3	Core Course 6	6	4	3
4	Core Course 7	4	3	3
5	Core Course 8	5	3	3
6	Core Course 9	5	3	3
7	Core Course 10 Practical	*	3	*

SEMESTER 6

No	Title of the Course	Hours / week	Credit	Exam hrs
1	Open Course 2	2	2	3
2	Core Course 11	5	2	3
3	Core Course 12	5	3	3
3	Core Course 13	3	2	3
4	Core Course 14	4	3	3
5	Core Course 15	4	3	3
6	Core Course 16 Practical II	*	4	*
7	Core Course 17 Practical III	*	4	*
8	Core Course 18 Project	*	2	*
9	Core Course 19 Elective	2	2	3
10	Core Course 20 Practical IV	*	2	*

The Hour/Credit distribution for Complementary Theory/Practical examination shall be decided by the Board of Studies concerned.

Preface

The restructuring of undergraduate courses of Plant Science/Botany programme was done by the Board of studies in Botany (UG), Kannur University according to the proposal of the Kerala State Higher Education council. The Board has prepared the syllabi, model question papers and scheme of examination of fourteen core courses, four complementary courses, six elective courses and four general courses for Plant Science (UG) programme and six open courses for other disciplines.

The content of the core courses is reworked, taking all the core courses as one unit. An evolutionary link has been maintained throughout the subjects beginning with instrumentation and methodology, passing through origin and evolution of biodiversity and ending with ecology and conservation. Restructuring was done to make it contemporary and on par with the emerging concepts of twenty first century. It is so designed as to incorporate the new advances and trends in the disciplines within the limitations of the UG syllabus. That is why the Plant physiology course is split into Energy and Intermediary metabolism course and Physiology courses. While restructuring, the changes which have been incorporated in the plus two syllabus is also taken into consideration. The syllabus is designed according to semester pattern and choice based credit system. The remodeling of the syllabus makes it necessary to have an inter-disciplinary approach. The syllabus has focused to impart the latest concepts in Cell Biology, Molecular Biology and Biotechnology.

The syllabus has been developed to arouse the curiosity of the students and inculcate in them a sense of spirit, wonder and appreciation to the dynamics of nature. The syllabus has been rewritten clearly and concisely so that the students should have knowledge to appreciate the environment, ecology and biodiversity aspects of plants when taken on a field trip.

Herbal science/medicinal botany in the core subject deals with the study of phytodrugs and substitute plants in Indian System of Medicine (alternative systems of medicine). It has been drafted to enrich the students with the identification of plants and phytodrugs. The study of Medicinal Botany and Economic botany enriches the Systematic Botany which can be utilized for botanical diagnosis of fragmentary crude drugs. This study will be useful in identifying medicinal taxa; since the students are aware of systematic botany (Morphology and Taxonomy of Flowering Plants).

The curriculum for B.Sc. programme in Plant Science which is of six semester duration contains in all fourteen core theory courses. The theory courses along with four practical

courses, one elective and one project course earn 54 credits for all the core courses. During the first 4 semesters, 4 courses with 3 credits each are given, while during the 5th and 6th semesters, 10 courses are offered, each course with 2, 3 or 4 credits and a total of 4 practical courses are given. Each practical course is a four credit course. These fourteen core courses offered at the Undergraduate level are so designed to unfold gradually the unifying principles underlying the rich diversity of living beings and reveal the commonness among the organisms at molecular, organelle, cellular, tissue and organ levels and bio-chemical and genetic levels, so as to understand the unity of all living beings. A course on quantitative methods in biology is also incorporated in the beginning of the programme to give the basic knowledge of statistics needed for better understanding of various biological phenomena and biological systems. There is much greater emphasis on newly emerging areas. An option is provided for the students to choose inter departmental electives in 5th and 6^{th} semesters. While retaining the basic concepts of the subject, fourteen practical components are designed in correspondence with the theory courses to impart the skills and techniques required in these areas. Seminars, tutorials, quiz, assignments, field survey, project, study tour *etc.* supplement the programme of instruction relating to a unit.

Question paper patterns are prepared in such a way that they should probe the subject depth of students and make them think and apply what they have learnt through the syllabus instead of relying on memory and knowledge.

The syllabus will give a solid foundation for the post-graduate courses like Molecular Biology, Microbiology, Life Sciences, Medical Genetics, Horticulture, Computational approaches to protein/hereditary Science, Bodiversity and Taxonomy, Evolutionary Ecology and Environmental Conservation and Plant Biotechnology.

The enclosed syllabus includes 14 core courses, one departmental elective, four core practicals and one project for UG Plant Science programme. The total number of inter departmental Botany/ Plant Science open courses offered are six (out of which two have to be selected).

Sd/-
Dr. Kochuthresiamma Andrews,
Chairperson, BOS, Botany (UG)

Scheme Core Courses(Plant Science)

No.	Semester	Course code	Title of the course	hour/ week	Credits
1	II	2B01PLS/ 2B02BOT	The science of Botany-Methodology and Instrumentation	2+1	2
2	III	3B02PLS	Horticulture	3+2	2
3	IV	4B03PLS	Herbal Science	3+2	2
4	IV	4B04PLS/ 4B04BOT	The Origin of Living Things:Biomolecules and Cell Biology	3+2	3
5	V	5B05PLS/ 5B05BOT	Energy and Intermediary Metabolism	2+1	2
6	V	5B06PLS/ 5B06BOT	Genetics and molecular biology	4+2	4
7	V	5B07PLS/ 5B07BOT	Evolution, paleontology and Plant Breeding	3+1	3
8	V	5B08PlS/ 5B08BOT	Diversity of Life-1: Microbiology, Mycology, Phycology, Lichenology and Plant Diseases	3+2	3
9	V	5B09PLS/ 5B09BOT	Diversity of Life-2: Bryology, Pteridology and Gymnosperms	3+2	3
10	V	5B10PLS/ 5B10BOT	**Core Practicals -1-M**ethodology, Intermediary Metabolism, Biomolecules, Cell Biology, Paleontology, Genetics and Bioinformatics.	*	3
11	VI	6B11PLS/ 6B11BOT	Diversity of Life-3: Angiosperm Systematics and Morphology	2+3	2
12	VI	6B12PLS/ 6B12BOT	Plant Form and Function-1-Angiosperm Anatomy and Reproductive Botany	3+2	3
13	VI	6B13PLS/ 6B13BOT	Plant Form And Function-2: Plant Physiology	2+1	2
14	VI	6B14PLS/ 6B14BOT	Biotechnology, Nanobiotechnology and Plant Tissue culture	3+1	3
15	VI	6B15PLS/ 6B15BOT	Environmental Science and Phytogeography	3+1	3
16	VI	6B16PLS/ 6B16BOT	**Core Practicals -2-** Microbiology, Mycology, Phycology, Lichenology, Bryology, Pteridology, Gymnosperms and Plant Pathology	*	4
17	VI	6B17PLS/ 6B17BOT	**Core Practicals-3-** Angiosperm Anatomy, Angiosperm Morphology, Systematics, Reproductive Botany, Plant Physiology, Environmental Science, Biotechnology and Molecular Biology	*	4
18	VI	6B18PLS/ 6B18BOT	Project work/field visit/study tour	*	2
19	VI	6B19 PLS/ 6B19BOT	Title of the **ElectiveCourses**	1+1	2
			1.Utility of Plants and Medicinal Botany		
			2.Plantation Botany		
			3.Nursery Management and Mushroom Cultivation		
			4.Ethnobotany		
			5.Pharmacognosy		
			6.Seed Technology		
20	VI	6B20PLS	**Core Practical-4-** Horticulture and Herbal Science	*	2

Scheme Open Courses

No.	Semester	Course code	Title of the course	Contact hour/week	Credits
1	V	5D01PLS /BOT	1.Horticulture	2	2
			2.Mushroom cultivaton and marketing		
			3.Environmental Science		
2	VI	6D02PLS/BOT	4.Medicinal plants	2	2
			5.Forestry		
			6.Biotechnology		

.**ELIGIBILITY TO APPEAR FOR PRACTICAL EXAMINATIONS**
Submission of the following: 1.Certified Practical Record 2.Certified Herbarium sheets 3.Certified Field Book 4.Certified Tour Report 5. Project Report(Certified and Bonafide) 6.Collections as mentioned along with respective practical papers with a brief report (Verify this Report on the specified day of Practical Examination.)

Assessment: External and Internal

End-semester Assessment : 75%
Continuous Assessment : 25%

GENERAL SCHEME OF EXTERNAL EXAMINATIONS
(End-semester Assessment)

Details of Papers	Duration of Exam	Weightage
Theory & Practicals		
Plant Science/ Botany (Core) courses	3 Hours	30
Botany-complementary courses	3 Hours	30
Botany -Open Courses	3 Hours	30

Project Work:
Each student must submit a duly certified report of a project work carried out by him related to the elective paper or any topic related to Botany at the end of the sixth semester. Topic of the project shall be given during the earlier semesters. The students may be grouped into different batches assigning projects of different topics. The project report may be certified by the supervising teacher and the Head of the Department.

Viva-voce:
The students are required to appear for a viva-voce during the practical examination of the sixth semester. Viva-voce will be based on the research methodology and the content of the project.

General Scheme of Questions for Theory Examinations of Core,Complementary and Open Courses of Botany/Plant Science Programme				
SECTION	TOTAL QUESTIONS	QUESTIONS TO BE ANSWERED	WEIGHTAGE TO BE AWARDED	TOTAL WEIGHTAGE FOR ALL QUESTIONS
A	5 bunches(5x4)	5 bunches(5x4)	1x 5 = 5	5
B	6	4	1 x 4 = 4	6
C	7	5	1 x 5 =5	7
D	8	6	2 x 6 =12	16
E	3	1	4 x1 = 4	12
Total	29	21	30	46

Sd/-
Dr.Kochuthresiamma Andrews
Chairperson, Board of studies, Botany (UG),

General/Core Courses

B.Sc. Plant Science/Botany

General – 1:

METHODOLOGY AND PERSPECTIVES OF SCIENCES

Course Code : 1A14PLS/ 1B01 BOT
No. of credits : 4
No. of contact hours : 72+18

Aim of the Course

To introduce the methodology and perspectives of Science in general so as to enable the students to systematically pursue his particular discipline in science in relation to other disciplines that come under the rubric of sciences.

Objectives of the Course

- To learn the fundamental characteristics of science as a human enterprise
- To understand how science works
- To apply scientific methods independently

Course Outline

ModuleI- Science and Science Studies 12Hrs

Types of knowledge: practical, theoretical and scientific knowledge, information.

What is science; what is not science; laws of science, Basis for scientific laws and factual truths.-Science as a human activity, scientific temper, empiricism, vocabulary of science, science disciplines.-Revolutions in Science and Technology.

Module II- Methods and Tools of Science 15Hrs

Hypotheses; theories and laws in science; Observations, evidences and proofs-Posing a question; formation of hypothesis; Hypothetico-deductive model, Inductive model. Significance of verification (proving)-corroboration and falsification (disproving)-auxiliary hypothesis-adhoc hypothesis- Revision of scientific theories and laws-Importance of Peer Review

Module III- Experimentation in Science 18Hrs

Design of an experiment- experimentation-observation-data collection- interpretation and deduction-Necessity of units and dimensions-repeatability and replication-Documentation of experiments-Record keeping.-Connection between measurements and underlying theory-

Types of Experiments-Experiments to test a hypothesis-to measure a variable or to gather data by preliminary and explorative experiments-Planning of experiments- Design-selection of controls-observational requirements,-instrumental requirements-Scientific Instruments-Sensory extension- choice and selection of instruments-sensitivity of instruments- Accuracy and precision and errors-Types of instrumentation-Historical development and evolution of scientific instruments-Robotics- (*Only a general orientation of scientific instruments required*)-Making observations- direct and indirect observations-controlled and uncontrolled observations-human and machine observations- human error-Examples of great experiments in science. (*To illustrate how various tools were applied to answer a question).*

Module IV– Data handling 18 Hrs

Documentation of experiments-Nature and types of data- typical examples-Data acquisition-Treatment of data-Data interpretation- Significance of statistical tools in data interpretation-errors and inaccuracies-Data presentation: graphs, tables, histograms and pi diagrams. Statistical testing of hypothesis-null hypothesis- Significance test-Statistics based acceptance or rejection of a hypothesis. Deduction of scientific correlation- patterns and trends.

Statistical terms – Population, Sample, Unit, Variable, Constant, Parameter- Data-Inference-Accuracy and precision- Role of Biostatistics in modern Research – Application of Biostatistics- Measuresof Centraltendency-ArithmeticMean-Median-Mode- Measures of Dispersion–Range, Standard deviation, standard error-Correlation and Regression – brief account only; Analysis of variance ANOVA – brief account only; Regression analysis – brief account only.

Module V– Ethics in science 9Hrs

Ethics in Science- Scientific information-Depositories of scientific information-primary, secondary and digital sources-. Sharing of knowledge-transparency and honesty-danger of preconceived ideas-Reporting of observational and experimental data-human bias-Biased observations- Influence of observer on observations- using and acknowledging observations by others-Publications and Patents (Details not required)- Concepts of IPR, copyrights and patents-Plagiarism.

Practicals 18 Hrs

1. Work out problems on measures of central tendencies, measures of dispersion.
2. Measurement of specimens using micrometer.
3. Photomicrography and camera lucida drawings.
4. Familiarizing with different biological instruments.
5. Collection, identification and submission of plants using different preservation methods.

Reference Books

1. Collins H. and T. Pinch, *The Golem: What You Should Know About Science*, Cambridge University Press, 1993.
2. Giceryn, T.F. *Cultural Boundaries of Science***,** Univ. Chicago Press, 1999.
3. Hewitt, Paul G., Suzanne Lycons, John A.Suchocki and Jennifer Yeh, *Conceptual Integrated Science***,** Addison-Wesley, 2007.
4. Kothari C.R(2008) *Research Methodology: Methods and technique*,New age International,new Delhi
5. Lee J.A (2010), *The Scientific Endeavour: Methodology and Perspectives of Sciences*, Dorling Kindersley India Pvt. Ltd., New Delhi.
6. Newton RG. *The Truth of Science***:** New Delhi, 2nd edition Bass, Joel,E. *et al*., *Mehods for Teaching science as Inquiry***,** Allyn & Bacon, 2009.

B.Sc. Plant Science/Botany

CORE – 1:

THE SCIENCE OF BOTANY-METHODOLOGY AND INSTRUMENTATION

Course Code : 2B01PLS/2B02 BOT
No. of credits : 2
No. of contact hours : 90hrs (54+36)

Aim & Objectives

1. To enable the students to appreciate the scientific facts and principles discovered by other scientists in the field of Plant Science.
2. To train them in the use and maintenance of scientific equipment in biology.
3. To develop in them the scientific way of doing and making them understand that there are many models of experimentation that are possible.
4. To train them in the process of the methodology of biological science

Module-1 9Hrs

The nature and logic of biological sciences- Biology is the science of life. Scientist form generalizations from observations -. The scientific method.- Elements of scientific method - inductive and deductive logic- The application of logic –a case study-computational approaches.

A case history of scientific experimentation (The discovery of DNA) –hypothesis and development- predictions from the hypothesis- experiments-testing and improvement-confirmation-Early history and development of methods in Biology- Development of the microscope as an example- Man's use of biology-past, present and future -Revolutionary changes in biology- Research in biology-Historical perspective -Pure and applied bioscience.

Module-2 7Hrs

Major Generalizations in Biology.

The cell concept-the gene concept- The continuity of the germ plasm-Evolution-molecular foundation in biology-biological inter relation-the mechanism and vitalism and natural selection. A general discussion on the evolution of molecule to organism-classification.

The science of botany-Botany as a science-method of science-experimental and descriptive.-the facts of science.-botany and other sciences.-development of botany-scope of botany.-contributions of botany-plants and world affairs -plants as living things-A brief survey of major plant groups.

Module3 7Hrs

Experimental Designs in Botany- Research methodology.-different from other disciplines.-Biological abstracts- Planning of experiments: Design, selection of controls, observational requirements, instrumental requirements-experimental errors- Experimental designs in Botany (Enable students to plan experiments of their own in different fields.)

Module4 Biological Instrumentation and methodology 25 hrs

History and development- an overview

Methods in Cell Biology-Microscopy and Microtechnique

Introduction- Light microscope- compound microscope- -the instrument. The optics of the instrument -magnification, resolution. - objective lenses- ocular lens- aberration of lenses- visibility-preparation of specimens – Whole mounts, Maceration, Cytological methods- Smear and squash preparation - Killing and fixing agents- Carnoys formula, Farmers formula and F.A.A-.Dehydration – reagents-.Sectioning- hand and microtome.- rotary and sledge- Stains and staining techniques- double staining. Common stains- saffranin, haematoxylin, acetocarmine.-Mounting media- D.P.X. and Canada balsam.

Phase contrast microscopy- Fluorescence microscopy-videomicroscopy and image processing-photomicrography-camera lucida drawing- Electron microscopes-SEM, TEM, AFM - Micrometry- colony counter.

Methods in Molecular biology and Biochemistry.

Cell culture- Sterilisation methods - Autoclave, Laminar air flow, uv irradiation- fractionation of a cell's contents-differential centrifugation- Instrumentation and principle of Homogenizer and Ultrasonicator- isolation, purification and fractionation of proteins- Separation techniques-Centrifuge, Chromatography and electrophoresis-PAGE- isoelectric focusing- protein/nucleic acid measurement and analysis- Spectrophotometry-principles-instrumentation-Colorimeter and Spectrophotometer-applications-Radioisotope techniques in biochemistry-.autoradiography-.Histochemistry- methods-Buffers- their principle and functions in biological systems- preparation and uses of buffers in biological research, pH meter

Preservation methods-Lyophilisation, Cryopreservation, Herbarium technique, Formaldehyde or FAA/Whole mounts.

Palynology techniques-Acetolysis of pollen grains

Methods of Plant breeding -Hybridisation techniques

Module 5- Biology-Ethical, legal and social issues 6Hrs

Social issues - public opinions against the recombinant technologies.-Biodiversity and farmer's rights; Legal issues – legal actions in the field of agriculture- and on patent rights- biosafety regulations; Ethical issues – ethical issues against the molecular technologies. –stem cell research-cloning- genetic testing in humans-Bioethics – Necessity of Bioethics, different paradigms of Bioethics – National & International issues.-Patenting life forms.

Practical **Total hours – 36**

1. General awareness of Micro technique, maceration, smears & squash
2. Demonstration of microtome sectioning and hand sectioning
3. Separation of plant pigments by paper chromatography.
4. Demonstration of Emasculation and Hybridization, budding, grafting and layering.
5. Study of pollen morphology of the following plants –*Hibiscus*, *Vinca*, *Balsm*, *Ixora*, *Crotalaria*, *Bougainvillea.*
6. Acetolysis of pollen grains
7. Preparation of buffer.

8. Measurement of pH.

9. Construct the absorption spectrum of any sample.

10. Visit to Laboratories**.**

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1. Bajpai, P.K. (2008) Biological instrumentation and methodology, S. Chand and company Ltd, .New Delhi.
2. Carl L. Wilson and Walter .E. Loomis. (1970) Botany (5th Edn.) Holt, Rinehart and Winston,Inc.
3. Casey E. J. - Biophysics – Concepts and Mechanics Van Nostrand Reinhold Company.
4. Galen .W. Ewing - Instrumental methods of chemical analysis Mc - Graw Hill Book Company
5. Graeme D.Ruxton and Nick Colegrave(2006) Experimental design for the life sciences(2^{nd} Edn.) Oxford university press
6. James H.Otto and Albert Towle(1973) Modern Biology Holt,Rinehart and Winston,Inc.
7. Jeffrey J.W.Baker-Garland.E.Allen(1968)-The study of biology-Addison-wesley publishing company-Reading,Massachusetts.
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10. Raven, PH; Johnson, GB; Losos, JB; Singer, SR (2005), *Biology, seventh edition*, Tata McGraw-Hill, New Delhi
11. Sass, J .E (1965) Botanical Micro technique
12. Shaleesha A Stanley. 2008 Bioethics, wisdom education service-Chennai.
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Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Theory -Plant Science/BotanyModel Question Paper

CORE COURSE – 1

2B01PLS/2B02BOT **-THE SCIENCE OF BOTANY - METHODOLOGY AND INSTRUMENTATION**

Time: 3 Hours **Total Weightage: 30**

Draw diagrams wherever necessary

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. 1.Choose the correct answer

i) The amount of light absorbed by a material is proportional to the concentration of the absorbing solution is referred as --------
   a) Beer's law
   b) Boger-lambert law
   c) Poiseuille's law
   d) all of the above

ii) The first patented life form belongs to the kingdom
   a) Plantae
   b) Monera
   c) Protista
   d) Animalia

iii) The ratio of diameter of lenses to its focal length is referred as -----
   a) Magnification
   b) Resolution
   c) Numerical aperture
   d) none of the above

iv) From the following experimentally obtained observations regarding mineral nutrition in plants ,dra w a conclusion as to the factor or factors necessary for the development of chlorophyll in green plants.

Observation 1 : Plants grown in soil containing chloride and magnesium, and supplied with light become green.

Obs 2 . plants grown in soil containing chloride but not magnesium, and supplied with light remains white

Obs 3 . plants grown in soil containing chloride and magnesium, but kept in dark remains white

Obs 4 plants grown in soil containing magnesium not chloride, and supplied with light become green.

a)magnesium and chloride are essential for chlorophyll
b)magnesium is essential
c)magnesium and light is essential
d)magnesium,chloride and light is essential

2 i) Each division of stage micrometer equal to --------

a) 0.01mm
b) 1 µm
c) 0.1mm
d) None of the above

ii) _____ controls the intensity of light entering in microscope.

a) Iris Diaphragm
b) Mirror
c) Condenser
d) All of the above

iii) In paper chromatography which of the following act as a stationery phase

a) water
b) cellulose
c) organic solvent
d) none of these

iv) The finding that there was little or no water within the DNA molecule led Watson to build the correct structure of DNA.Who among the following scientist correctly spotted the mistake concerned with water content?

a) Linus Pauling
b) Maurice Wilkins
c) Rosalind Franklin
d) Erwin Chargaff

3. State true or false

i) An observational investigation does not generally start out with a hypothesis
ii)The concept of partition coefficient is the basic principle of all chromatographic methods.
iii) DPX is a killing and fixing fluid.
iv) PAGE stands for Polyadenylamide gel electrophoresis

4. Fill in the blanks

i**)**The technique of isoelectric focussing was discovered by…**……..**
ii)The most widely used apparatus for the determination of radioactive isotopes is…….
iii) The unit of sedimentation coefficient is known as …….
iv) For studying the external morphology of pollen grains, ……..technique is commonly used.

5. The following are nobel prize winners .Rearrange column B and C to match column A

Atoine Henry Becquerel	TransmissionElectron	1993
Frederike Zernike	PCR Microscope	1986
Earnst Ruska	Phase contrast microscopy	1903
Kary Mullis	Radio activity	1953

Section -B

Answer any ***Four***

Differentiate the following: Each question carries a weightage of 1)

6.Pure and applied bioscience

7.Carnoys formula and Farmers formula

8. magnification and resolution of a light microscope.

9. farmers right and patent right

10. inductive and deductive logic with examples in life science.

11. Stage micrometer and ocular micrometer.

Section C

Answer any ***seven***

(Short answer questions*;* each question carries a weightage of 1)

12. Give an account of the experemental Designs in Biology with an example.

13. Discuss the way in which progress in biology has paralleled the perfecting of the microscope.

14. Why must a scientist be careful not to extend his experimental conclusions in organisms other than those with which he worked?

15. What is meant by 'continuity of the germ plasm'?

16**.** List out the various methods used for sterilization of equipments and media

17. Define transmittance and absorbance.what is the difference between these two and how they are related to each other?

18. What do you mean by a phase contrast?How this phenomenon is useful to a biologist?

19 What do you mean by histochemistry and give a list of atleast four stains with the type of tissue component stained by each of them?

20. How cryo preservation may injure the tissue and what measures will you take to prevent that?

21. Describe controlled experements which demonstrates the following:
   a) The liberation of heat in the germination of seeds.
   b) The affect of light on the directionofgrowthof shoots

Section D

Answer any ***Six***

(Short essay- type questions*;* each question carries a weightage of 2)

22. What are buffers? Give an account of their application in biological systems and research.

23**.** Discuss the principle and technique of Gas liquid Chromatography

24. What is herbarium? Describe the technique of preparation of herbarium specimen.

25. Give a historical perspective of research in Botany

26. Discuss the condition under which natural science originated,including factors that may have influenced the development.Give a brief account on the contribution of life science.
27. What is the cell concept as we understand it today? What did the following men contribute to the development of the cell concept**:**

(a)MatthaisSchleiden? (b) Theodor Schwann? (c)Rudolf Virchow?

28. Give protocols of single and double staining studied by you.

Section E

Answer any **One**

(Essay- type questions; Each question carries a weightage of 4)

29**.** A plant physiologist observed the following deficiency symptoms in a plant . Leaf Necrosis, Leaf Chlorosis, Poor flowering and fruiting and Shedding of leaves

Devise a hypothesis to explain each of the above observations.Then Design an experiment or experements to test your hypothesis,

30 (a) Why certain substances or solutions appear to have a particular color? How this property is useful in estimating the concentration of such substance in a solution?

(b) Explain the principle, technique and application of centrifugation in biology.

31**.** Describe the various steps involved in the preparation of a permanent serial section.

B.Sc. Plant Science
GENERAL - 2
HISTORY AND PHILOSOPHY OF SCIENCE

Course Code : 3A06PLS
No. of credits : 4
No. of contact hours : 90

Aim of the Course

• To give the students a basic understanding about the evolution of science and scientific method, and to instill in them excitement about science, as a process and not merely as a product.

Course Objective

1. To enable the student to realize that science is a grand human endeavour, a search for the secrets of the Universe through a methodology, which is based on facts and proven results only, without recourse to any supernatural power or influence.
2. To create the ability to trace the evolution of this process, and to distinguish it from other methods of 'seeking the truth'.
3. To understand and appreciate the contribution of various peoples and civilizations to this pursuit, and also to discern the kind of socio-political environment which encourages scientific inquiry and which stifles it.
4. To develop familiarity with the current challenges facing science and scientific temper.

Scope of the Course

Major areas of scientific developments would be covered in the course. The Instructor (as well as the Question Paper setter) should keep in mind the fact that this is a course offered to all the students, pursuing different disciplines, and therefore, only a general familiarity with the subject matter is expected of the student. The emphasis should be only on the process of scientific discovery and not on the content of it.

Course Outline

Module I

Origins of scientific inquiry - Babylonian and Egyptian astronomy - the calendar and its relevance to agriculture - Greek, Roman, Indian and Chinese contributions to science - Aryabhatta,Brahmagupta and Bhaskaracharya - The deductive method of Aristotle and its constraints. The Geocentric and conflicting views in the ancient world - The primitive atomic theory - Early views on the origin of life and cosmogony.

Module II

The growth of science in the middle ages - The contributions of the Arabs and their role in transferring knowledge from the East to West - The later contributions of India (and specifically Kerala) to Mathematics and Astronomy - The so-called 'Golden Ages' in various societies and the factors which contributed to them - Contributions of Fibonacci (Leonardo of Pisa), Roger Bacon and Leonardo da Vinci - Signs of the coming dawn in Europe.

Module III

The emergence of 'modern' science - Galileo and the experimental method - Bacon and Descartes - The transition from the deductive to the inductive method - Copernicus, Brahe, Kepler and the overturning of the geocentric model - Newton and the mechanistic picture of the universe - The developments in Mathematics and the deterministic era - Emergence of modern medicine - The work of John Hunter, Joseph Lister, Louis Pasteur and Robert Koch- Linnaeus and the birth of Modern Biology - Mendel and Darwin - Twentieth century science and the challenges of Radioactivity, Relativity and Quantum Theory - The New Frontiers: the very small, the very large and the secret of life.

Module IV

Introduction to Philosophy of Science - Relationship between History and Philosophy of Science - Basic Components of Science - Scientific Reasoning – Deduction and Induction - Observation and Measurement – Inference - Probability and Induction - Experimentation and Realism - Scientific Explanation – Reductionism and Unity of Science.

Module V

Scientific Change and Progress - Inductivism and Falsificationism - Paradigms and Research Programmes - Science as Problem-Solving and Technologism - Science & Technology - Science and Values - Science and Religion - Science & Society.

Core reading

1. Menon R.V.G.: History of Science and Technology, Calicut University Central Cooperative Stores, 2002 [Units 1 to 5]
2. Okasha Samir. Philosophy of Science : A Very Short Introduction, Oxford University Press, New York , 2002
3. Boersema, David. Philosophy of Science, Pearson Education, 2009

General Reading

1. P. K. Sengupta (Gen. Ed): History and Philosophy of Science, Pearson Longman.
2. Jaggi, O.P.: A Concise History of Science, Atma Ram & Sons, Delhi
3. Richard Dewitt: World Views: An introduction to the History and Philosophy of Science, Blackwell publishing, 2004 [Units 3 and 5]
4. Bernal, J. D.: Science in History, C.A.Watts, 1965

Journals

The following journals, which are easily available in India, carry occasional articles relating to the History of Science.

1. Current Science, Published by Indian Academy of Sciences, Bangalore
2. Resonance, Published by the Indian Academy of Sciences, Bangalore
3. Vigyan Prasar, Published by Vigyan Prasar, Dept of Science and Technology, Government of India.

B.Sc. Plant Science
CORE – 2:

HORTICULTURE

Course Code : 3B02PLS
No. of credits : 2
No. of contact hours : 90hrs (54+36)

Aim & Objectives

- To understand the cultivation of locally available ornamental, vegetable and plantation crops.
- To learn propagation methods.
- Job opportunity and study the need of horticultural therapy.
- To understand the post harvest technology of crops.

MODULE I **16 Hours**

History, Scope and divisions of Horticulture, garden tools and implements- Methods of vegetative propagation-cutting, layering and grafting. Propagation by specialized stem and roots-bulbs, corms, tubers, rhizomes and pseudobulbs. Media for propagation of nursery plants- characteristics of media- common media for propagation- soil, sand, peat, sphagnum moss, vermin culite. Soil mixture and nursery beds. Manures: Organic and inorganic; Irrigation methods.

MODULE II **11 Hours**

Important ornamentals-habit and types. Types of gardens-Indoor garden, Kitchen garden and public garden. Garden components- lawn making, glass house, rockery, water garden and topiary. Landscaping- Principles of landscaping designs, components of landscape designs, lawn grass varieties, Arboriculture and role of trees in landscaping.

MODULE III **15 Hours**

Olericulture- Definition- Importance of vegetables- Production technology- Cultivation of vegetables- Bhindi, Brijal, Bitter gourd, Pumpkin, Colocasia, Tapioca and Tomato.
Pomology- Definition and Importance-Cultivation of fruits- Banana, Pineapple and mango. Growth regulators in horticulture. Plant protection measures for horticultural crops.

MODULE IV **8 Hours**

Floriculture- Definition and Importance- Cultivation of flowers- Jasmine, Rose, Chrysanthemum, Gladiolus, Aster Orchids and Anthurium. Cultivation of plantation crops- Cardamom, Coffee, Tea, Coconut and Cashew.

MODULE V **4 Hours**

Preservation of fruits and vegetables; Cut flowers- Flower arrangement and Bonsai.

PRACTICALS (36 Hours)

1. Demonstration of vegetative methods of propagation
2. Flower arrangement with cut flowers.
3. Preparation of potting mixture of known combination
4. Visit to a well established nursery.

REFERENCES

1. Bhattacharjee, S.K. 2006. Advances in Ornamental horticulture. Pointer Publications, Jaipur.
2. Bose, T. K, J. Kabir, P. Das and P.P. Joy. 2001. Tropical Horticulture. Naya Prakash Publications, Calcutta.
3. Chaha, K.L. 2001. Handbook of horticulture. ICAR, New Delhi.
4. Desh Beer Singh and Poonam Wazir. 2002. Bonsai- an Art. Scientific Publishers, Jodhpur.
5. Edwin Biles. 2003. The Complete book of gardening. Biotech book, New Delhi
6. Kumar, N. 1999. An introduction to horticulture. Rajalakshmi Publication, Nagarcoil.
7. Sharma, V.K. 2004. Advances in Horticulture: Strategies, production, plant protection and value addition- Deep and Deep publications, New Delhi.
8. Singh, S.P. 1999. Advances in Horticulture and Forestry. Scientific publishers, Jodhpur.

KANNUR UNIVERSITY EXAMINATION

Theory -Plant Science Model Question Paper

Reg. No: Code:

Name :

Core Course- 2

3B02PLS- HORTICULTURE

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer

i) The process of breaking dormancy of seed by cracking is called as
(Scarification, stratification, sterilization, none of these)

ii) The development of embryo through asexual reproduction is called as
(Apospory, apogamy, Apomixis, none of these)

iii)------- are called the primary nutrients in plants
(Mn Zn K, NPK, Ca Mg K, None of these)

iv) The branch of horticulture, which deals with the cultivation of fruits, is
(Pomology, Olericulture, palynology, floriculture)

2. Fill in the blanks

i) A natural green carpet of garden in called----------

ii) The branch of horticulture, which deals with the cultivation of trees, is called----------

iii) Covering of an area, preferably a bed or a series of beds with dense, low growing herbaceous plants, creating some letters is called----------

iv) A step like configuration of the field along the contour, by half cutting and half filling, to minimize soil erosion is called as----------.

3. True or false

i) Mycorrhizae are beneficial fungi that grow in a plant, symbiotic relationship on the root

ii) Growing of two or more vegetable crops in the same field at the same time is called mixed cropping

iii)Removal of moisture under controlled conditions of temperature, humidity and flow of air is called scarification

iv) Post harvested treatment given to vegetables for fast healing of mechanical injury, lowering the moisture contact and reducing the rotting of fungal growth is called curing

4. Match the following

i) Snake gourd - *Momordica charantia*

ii) Bitter gourd - *Lycopersicon esculentum*

iii) Ladies finger - *Trichosanthes anguina*

iv) Tomato - *Abelmoschus esculentus*

5. Answer in one word or in one sentence

i) Mulching
ii) Vermiculite
iii) Water garden
iv) Peat

Section B

Answer any four of the following: (Each question carries a weightage of 1)

Differentiate between

6. Rockery and Topiary
7. Olericulture and floriculture
8. Hedges and edges
9. Centering and tipping
10. Irrigation and fertigation
11. Hot bed and cold frame

Section C

(Short answer questions. Answer any *five;* each question carries weightage of 1)

12. Why orchids are not propagated by seeds?
13. What is the significance of glass houses in Horticulture?
14. What may be done to increase the storage of some cut flowers?
15. During rooting periods of bulbs and corms, soil should be low in nitrates- explain.
16. What are suckers? How suckering can be promoted?
17. Write a critical note on drip irrigation.
18. Briefly describe the method of potting orchid plants.

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Section D

Short answer questions. Answer any *six; e*ach question carries a weightage of 2.

19. What are the parameters to be taken care during the harvesting of flowers?
20. Give a brief description of different methods of pruning and its significance in trees.
21. Write briefly on the cultivation methods used in Anthurium. Give the name of two commonly cultivated varieties.
22. Describe at least three different types of layerage and indicate their special applications.
23. Describe the principal practices of a production unit in a nursery.
24. Describe the common garden tools and implements.
25. Give an account of various plant protection measures for horticultural crops.
26. Write briefly on the cultivation methods used in Tomato, Bhindi and Brinjal.

Section E

(Essay type question. Answer any one; each question carries a weightage of 4)

27. Describe the various steps to grow Bonsai.
28. How can a good lawn be prepared?
29. Give an account of the different types of growth regulators and their uses in Horticulture.

B.Sc. Plant Science/Botany
GENERAL - 3
GENERAL INFORMATICS & BIOINFORMATICS

Course Code : 3A13PLS/ 3B03BOT
No. of credits : 4
No. of contact hours : 90 (54+36)

Aim of the Course

To update and expand basic informatics skills and attitudes, relevant to the emerging knowledge society, and also to equip the students to effectively utilize the digital knowledge resources for their chosen courses of study.

Objectives of the Course

- To review the basic concepts & functional knowledge in the field of informatics.
- To review functional knowledge in a standard office package and popular utilities
- To create awareness about nature of the emerging digital knowledge society
- To create awareness about social issues and concerns in the use of digital technology
- To create awareness about major informatic initiatives in India and Kerala
- To impart skills to enable students to use digital knowledge resources in learning.

Course Outline

Module I - Overview of Information Technology (10 Hrs)

Features of the modern personal computer and peripherals, computer networks & Internet, wireless technology, cellular wireless networks, introduction to mobile phone technology, introduction to ATM purchase of technology, License, Guarantee, Warranty, overview of Operating Systems & major application software

Module II - Knowledge Skills for Higher Education (10 Hrs)

Data, information and knowledge, knowledge management- Internet access methods – Dial-up, DSL, Cable,ISDN,Wi-Fi - Internet as a knowledge repository, academic search techniques, creating cyber presence, case study of academic websites, open access initiatives, open access publishing models. Basic concepts of IPR, copyrights and patents, plagiarism, introduction to use of IT in teaching and learning, case study of educational software, academic services- INFLIBNET, NICNET, BRNET.

Module III - Social Informatics (10 Hrs)

IT & Society- issues and concerns- digital divide, IT & development, the free software movement , IT industry: new opportunities and new threats, software piracy, cyber ethics, cyber crime, cyber threats, cyber security, privacy issues, cyber laws, cyber addictions, information overload, health issues- guide lines for proper usage of computers, internet and mobile phones. e-wastes and green computing, impact of IT on language & culture-localization issues- Unicode- IT and regional languages 1.

Module IV - IT Applications (10 Hrs)

e-Governance applications at national and state level, IT for national integration, overview of IT application in medicine, healthcare, business, commerce, industry, defense, law, crime detection, publishing, communication, resource management, weather forecasting, education, film and media, IT in service of disabled, futuristic IT- Artificial Intelligence, Virtual Reality, Bio-Computing.

Module V-Bioinformatics (14 hrs)

Bioinformatics -Introduction, scope and fields of application. Protein Data bank (3D protein structure) Data retrieval tools and methods-NCBI- Entrez , SRS .Data base searches for homologous sequence- Fasta, Blast. Phylogenetic analysis (Phylip), Protein prediction, similarity search and gene finding.

Practicals - **36** Hours

1. Identification of common computer peripherals used in PC.
2. Create, Copy and Save a document with Header, Footer, Page No., Date & Time using any software.
3. Insert a table in the above document.
4. Prepare the mark list of students using any applicable software.
5. Create five slides using any applicable software, with different design templates.
6. Students are expected to work with at least any one of the commercial/ scientific packages, to explore the WEB and able to find, recognize, download, install and use software in various areas useful to the research of Biology.

References:

1. Alan Evans, Kendal Martin *et al., Technology in Action*, Pearson Prentice Hall (3rd edn.).
2. Alexis Leon & Mathews Leon, *Computers Today*, Leon Vikas.
3. Alexis & Mathews Leon, Fundamentals of Information Technology, Leon Vikas
4. Andreas D. Baxevanis (Editor) and B.F. Francis Ouellette (Editor) *Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins. Third Edition*
5. Arrwood A.T and D.J Parry-smith, *Introduction to Bioinformatics*, Pearson educationLtd.
6. Barbara Wilson, Information Technology: The Basics, Thomson Learning
7. Cynthia Gibas and Per Jambeck; *Developing Bioinformatics Computer skills* (2001)
8. David W.Mount, *Bioinformatics Sequence and Genome Analysis*, 2nd Edition (2004)
9. George Beekman, Eugene Rathswohl, Computer Confluence, Pearson Education.
10. Greg Perry, SAMS Teach Yourself Open Office.org, SAMS
11. Jing Xiong, *Essential Bioinformatics* (Cambridge University Press)
12. K.Mani and N.Vijayaraj. *Bioinformatics A Practical approach*. Aparna Publication
13. Neil C. Jones and Pavel A . Pevzner. *An introduction to Bioinformatics Algorithms*, Ane Books, Pvt. Ltd., New Delhi. 2004.
14. Parthasarathy, S.(2008), *Essentials of Programming in C for Life Sciences,* Ane Books, India, New Delhi.
15. Peter Norton, *Introduction to Computers*, 6th edn., (Indian Adapted Edition).
16. Rajaraman,V. *Fundamentals of Computers* (Printice Hall of India Pvt. Ltd)

17. Rajaraman,V. *Introduction to Information Technology*, Prentice Hall.
18. Ramesh Bangia, Learning Computer Fundamentals, Khanna Book Publishers
19. Röbbe Wünschiers 2004, *Computational Biology- Unix/ Linux, Data processing and programming*, Springer-Verlag, New Delhi.
20. Sinha, P.K. *Computer fundamentals* (BPB Publications)
21. Sushmita Mitra, Sanjay Datta, Theodore Perkins & George Michailidis. *Introduction to machine learning and bioinformatics* (Computer Science & data analysis) (2008)
22. Vijaya lakshmi & Pai & Rajasekar Nair, *Neural network.*
23. Wunschiers, R. *Computational Biology* (Springer)

Web resources :

www.fgcu.edu/support/office2000
www.openoffice.org Open Office Official web site
www.microsoft.com/office MS Office web site
www.lgta.org Office on-line lessons
www.learnthenet.com Web Primer
www.computer.org/history/timeline
www.computerhistory.org
http://computer.howstuffworks.com
www.keralaitmission.org
www.technopark.org
http://ezinearticles.com/?Understanding-The-Operation-Of-Mobile-Phone-Networks&id=68259
http://www.scribd.com/doc/259538/All-about-mobile-phones
http://www.studentworkzone.com/question.php?ID=96
http://www.oftc.usyd.edu.au/edweb/revolution/history/mobile2.html

Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Plant Science -Theory Model Question Paper

General course- 3

3A13PLS/ 3B03BOT -GENERAL INFORMATICS AND BIOINFORMATICS

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; each bunch carries a weightage of 1)

1.Choose the correct answer

i) The program which compares an amino acid sequence against a protein sequence database.

a) Blast n b) Blast p c) Blast x d) t Blast n

ii) Which one is a 3D structure database?

a) PDB b) Swiss-prot c) Genbank d) DDBJ

iii) Operating system is

a) A collection of hardware components c) A collection of software routines

b) A collection of input-output devices d) none of the above

iv) URL stands for

a) Universal Record Linking b) Uniform Resource Locator

c) Universal Record Locator d) Uniformly Reachable Links

2.Write '**True or False'**.

i) Boot strapping strategies are used for predicting sequence patterns.

ii) The language that the computer can understand and execute is called Machine language

iii) Gaps in alignments can be thought of as representing mutational changes in sequences.

iv) Spam is an anonymous, unsolicited bulk email.

3. **Fill in the blanks**

i) In phylogenetic evaluation, sequences which are assumed to be derived from a common ……..sequence

ii) …….. are the protein coding regions in a gene sequence

iii) Information is stored and transmitted inside a computer in…….form.

iv) A network that spans a large city is known as …….

4.Match the following

A	B
Maximum Parsimony	KEGG
Expasy	Molecular Visualization tool
Phishing	Distance Method
Rasmol	Cyber threats

5.Answer in one word or in one sentence

i) Wi-Fi.
ii) DDBJ.
iii) OMIM
iv)Unicode

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Web browser & Search engine
7. Virus & Worms
8. System software & Application software
9. t Blast n and t Blast x.
10. LAN & WAN
11. CATH and SCOP

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. What is the significance of multiple sequence alignment?
13. What is e-Governance? Explain its application at national level?
14. Explain Dot matrix analysis and Dynamic programming algorithm
15. What are the advantages of computer network?
16. Why is the importance of Cyber law?
17. What is a Firewall?
18. What do you meant by Bio-Computing?

Section D

Answer any *Six*

(Short-essay questions*;* each question carries a weightage of 2

19. Define the steps for multiple sequence alignment.
20. Explain the working of ATM?
21. Explain the role of IT in Teaching?
22. List the different programs in Blast and mention the use of each program.
23. Explain various categories of Cyber Crimes?
24. Write a note on IPR?
25. What are the applications of Artificial Intelligence?
26. Mention the use of the software FASTA and define the features available in this software.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Define the term Bioinformatics and its various fields of application?
28. Explain various Internet access methods?
29. Define the concept of Evolutionary trees and describe the four methods used for the prediction of evolutionary trees.

B.Sc. Plant Science
CORE COURSE-3 HERBAL SCIENCE

Course Code: **4BO3PLS**
No. of credits- 2
No. of contact hours- 90 (54+36)

Aim of the Course

- To understand fundamental concepts of medicinal plants
- To learn the principle of identifying medicinal plants and understand their medicinal uses
- To learn natural prescription for natural cures
- To understand metabolic engineering of natural products in medicinal plants

MODULE-1: 8 hrs

Historical background, present status, scope of Medicinal botany – Indigenous medical system-bioprospecting, indigenous knowledge systems, Ayurveda, Siddha, unnani,Homeopathy, Tibetan, Folkore medicines, Systems of medicine. Need to preserve knowledge systems.

MODULE -2: 10 hrs

Cultivation of medicinal plants**:**Conventional (sexual and vegetative) – Sexual propagation – Seed viability – Seed dormancy, types, methods of overcoming – Vegetative propagation – Grafting – Layering; Seed propagation. Cultivation of medicinal plans – Amla (*Phyllanthus emblica*), Glory lily (*Gloriosa superba*), Sadavari (*Asparagus racemosus*), periwinkle (C*atharanthus roseus),* Sarpagandha (*Rauvolfia serpentina*), Aloe (*Aloe vera*). Medicinal plants in wasteland management. Medicinal plants types suitable for cultivation in public gardens.

MODULE -3 5 hrs

Introduction and scope -Herbal preparations- General methods of phyto chemical & biological screening– extraction– Maceration, digestion, decoction, aromatic waste, extracts and tinctures. Purification and isolation of Plant constituents – Alkaloids – Glycosides – Volatile oils

MODULE -4 Commercial Aspects in Herbal Science: 10 hrs

Study of some herbal formulation as drug and cosmetics. Antioxidants and human health benefits. Drugs from leaves ,flower, seed, barks and roots. General properties of drug constituents: glycosides, saponins, enzymes, alkaloids, tannins, volatile oils, resins, gums, proteins and fixed oils.

MODULE -5 Ethnomedicine 16 hrs

Introduction-definition-scope. Role of AYUSH, NMPB, CIMAP and CDRI. Plants in primary health care: Common medicinal plants – chittamruthu (*Tinospora cordifolia*), tulasi (*Oscimum sanctum*), thippali (*Piper longum*), Karaka (*Terminalia chebula*), katarvazha (*Aloe vera*), Turmeric (*Curcuma longa*). Traditional medicine vs Modern medicine: Study of select plant examples used in traditional medicine as resource (active principles, structure, usage and pharmacological action) of modern medicine: Amukkaram (*Withania somnifera*), Sarpagandhi

(*Rauvolfia serpentina***)**, keezharnelli *(Phyllanthus amarus),* nelli(*Phyllanthus emblica*) and Brahmi (*Bacopa monnieri*). Medicinal plant conservation.

MODULE -6 **5 hrs**

Intellectual Property Rights: Patent, Plant variety protection bill, geographical indications, trade secrets, data base, trade mark, copy right, patent applications notification, sanctioning, Indian patent act, TRIPS, farmers right, biopiracy, status of WTO.

PRACTICALS: **36 hrs**

(1) Identification and description of medicinal plants
(2) Breaking of Dormancy by scarification, acid treatment
(3) Study of viability of different seeds- germination test, Tetrazolium test
(4) Cultivation of medicinal plants
(5) Propagation practices and planting of selected medicinal plants
(6) Collection of seeds of medicinal plants and prepare herbarium of seedlings of various stages
(7) Visit any medicinal garden.

REFERENCE

1. Atal, C.K. - Cultivation and Utilization of Medicinal Plants. R.R.L. Jammu.
2. Chada, K.L., Ravindran, P.N., and Leela Shajiram, 2000. Biotechnology in horticultural and plantation crops. Malhotra Publishing House, New Delhi.
3. Joshi, S. G. 2000. Medicinal Plants. Oxford and IBH, New Delhi.
4. Kapoor L.D, 2005 Hand book of Ayurvedic medicinal plants, CRCpress Anes books NewDelhi
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9. Sivarajan, V.V. and I. Balasubramaniyan. 1994. Ayurvedic Drugs and their Plant Sources. Oxford and IBH, New Delhi.

B.Sc. Plant Science
GENERAL -4

***ENTREPRENEURSHIP**

Course Code : 4A11PLS
No. of credits : 4
No. of contact hours : 90(54+36)

Aim and objectives

1) To establish relevance to emerging socio-economic environment and social prosperity;
2) Tto ensure equity of opportunity and participation
3) To instill and stimulate human urge for excellence.
4)To realize individual potential for generating goods and services by putting to use the inputs
6Acquiring Entrepreneurial Spirit and be Enterprising in all walks of life.
7 Familiarization with various uses of human resource for earning decent means of living.
8Understanding the concept and process of entrepreneurship - its contribution and role in the growth and development of individual and the nation.
9 Acquiring entrepreneurial quality, competency and motivation
10 Learning the process and skills of creation and management of entrepreneurial venture.

Course Outline

*** Will be provided later**

B.Sc. Plant Science/Botany

Core-4

THE ORIGIN OF LIVING THINGS- BIOMOLECULES AND CELL BIOLOGY

Course Code : 4B04 PLS/BOT
No. of credits : 3
No. of contact hours : 54+36

Aim and objectives

1) To make the students aware of the way by which life originated and how animate and inanimate matter differ each other with same types of molecules
2) To impart up-to-date knowledge in the field of biochemistry and cell biology
3) To create in them a scientific approach in understanding nature and its evolution, beginning with atoms to its complexity through the cell.
4) To enable them to appreciate the way scientists work in understanding evolution and the organization of cell.
5) To understand the mechanism of cell reproduction and its biological consequences.

Course Outline

Module1 (5hrs)

Organization of living things-hierarchical organization

Life at the molecular level-Biochemistry and the living state - The nature of molecules- Atoms are nature's building material-Chemical Bonds- Molecules and life- Water- the cradle of life-Physical properties- explanation- Hydrogen bonding of water- examples of benefit to life-Molecular logic of living organisms-Biomolecules and cells-Chemical composition of biomolecules and its evolution.-Pathway of Discovery-Experimental test of Prebiotic synthesis by Alexander Oparin- The primordial biomolecules- The origin of biomolecules-The fitness of biomolecules.- Hierarchy of Biomolecules (Organelles-supramolecular assemblies-macromolecules-Building block bio molecules-metabolic intermediates-precursors).

Module2 - The chemical building blocks of life-molecules 18hrs

Carbon: The frame work of biological molecules.

Carbohydrates:store energy and provide building material.-Classification-structure and function of monosaccharide, oligosaccharides and polysaccharides-synthesis of glycosidic bonds-enzymatic hydrolysis-Amylases and Invertases

Proteins:perform the chemistry of the cell.-Classification-properties-structure -Aminoacids - the building blocks of proteins - Classification based on polarity-structure-Amphoteric property of amino acids-peptide formation-Pathways of discovery-William C.Rose and the discovery of threonine-Three dimensional structure of protein-Molecular configuration and conformation-Biological function of proteins- Role of Bonds in stabilising protein structure.Denaturation and renaturation-Pathways of discovery-Linus Pauling and structural biochemistry(Ref-Voet & voet).

Nucleic acids store and transfer genetic information-Structure of nucleotides-purines and pyrimidines- Functions of nucleotides and nucleotide derivatives-ATP, NAD, NADP, FAD, FMN, cyclicAMP, cyclicGMP; Nucleic acids - DNA and RNA.
Lipids-make membranes and store energy – Classification- Complex lipids, Simple lipids-Storage and structural lipids; Fatty acids- saturated and unsaturated- triacyl glycerols-phospholipids and sphingolipids-lipids in membranes.
Secondary metabolites-A brief survey –Physiological role- significance.

Module 3 - The origin and early history of life. **(4hrs)**
.The time scale of Chemical and Biological evolution- Conditions leading to the Abiotic origin of Organic compounds -Prebiotic condensing agents.-Prebiotic formation of polypeptides-the prebiotic origin of enzymatic activity- prebiotic origin of Nucleotides and nucleic acids - Miller-Urey experiment.-RNA -the first living molecule. All living things share key characteristics. What is life?-fundamental properties.

Module-4- Biology of the Cell (4hrs)
All organisms are composed of cells-The origin of life verses the origin of cells. –Oparin's bubble hypothesis-protobionts-current thinking-the earliest cells**.** The origin of Prokaryotes and Eukaryotes- Introduction to the study of cell biology-The Discovery of cells-cellular properties and organization- size of cells-visualizing cells- History of the Progress of cell Biology-the Development of the cell theory- pre cellular evolution-Modern cell Biology-Evolution of prokaryotic and Eukaryotic cells. General Organisationof prokaryotic cells.

Module-5 Eukaryotic cell (10hr)
Morphological Diversity of Eukaryotic cells. Ultra structure and function of the following cell components and organelles**:Cell wall**:protection and support-A net work of cellulose microfibrils and a matrix-primary and secondary wall-Plasmodesmata- **Plasma membrane**-fluid layers of lipid-Unit membrane -Ultra structure-fluid mosaic model- lipid bilayer-membrane proteins – membrane channels- functions -**Cytoplasm**- physical and biological properties
Nucleus: information centre for the cell- ultrastructure of the interphase nucleus-The nuclear envelope:getting in and out-Nuclear pore-pore complex-chromosomes- nucleolus:manufactures ribosomal subunits-**Endomembrane system**-**Endoplasmic reticulum**:compartmentalizing the cell- **rough ER**:manufacturing proteins for export- biogenesis- **Golgi apparatus :**delivery system of the cell- **Vesicles: Enzyme store houses**- Lysosomes:intracellular digestion centres-polymorphism- composition- lysosomal enzymes- Microbodies-Peroxisomes, glyoxysomes-**Ribosomes:** sites of protein synthesis- Eukaryotic, prkaryotic mitochondrial and chloroplast ribosomes- Chemical composition of ribosomes-Dissociation and Reassociation during protein synthesis-Biogenesis of ribosomes-**Organelles that contain DNA- Mitochondria:**cell's chemical furnaces- **Chloroplasts:** where photosynthesis takes place- different types of

plastids-structure, position, function–endosymbiosis-origin and general organization of mitochondria and chloroplasts with reference to their functions- **Cytoskeleton:**interior framework of the cell-Actin filaments**,** microtubules, intermediate filaments- Centrioles**:** microtubule assembly centres –cell movement-**Vacuoles:** a central storage compartment.

Module-6 (9Hrs)

Chromosomes: packaging the DNA- Chromosomal shape is determined by the position of the centromere- Chromosomal nomenclature- Chromatid, centromere, telomere, satellite, secondary constriction, nuclear organiser.-Karyotype-All the characteristics of a chromosomal set.-Each chromosome has a single DNA molecule-Chromatin reticulum-Heterochromatin and Euchromatin- Chromosome morphology- fine structure,chemical organisation-organisation of DNA-Nucleo proteins-Chromatin is a complex of DNA and Histones- Nucleosomes- Satellite DNA -polytene chromosomes,Lamp brush chromosomes-B chromosomes-C-value paradox.

Chromosome mutation

Structural aberration. - Deletion, Duplication, inversion and Translocation

Numerical aberration-**Aneuploidy**-Monosomy-Trisomy-nullisomy

Euploidy- Polyploidy.- Haploidy

Human abnormalities due to alterations in chromosome number-Hereditary defects – Phenotypic effects-Cri-du-chat syndrome-Turner syndrome, Down syndrome, Klinefelter syndrome.

Module 7 - Cell Cycle (4hrs)

Five phases- Interphase: preparing for mitosis (G_1, S and G_2), Mitosis (M) and Cytokinesis (C) - duration of the cell cycle- cell cycle is genetically regulated.

Mitosis (M) is a key phase of the cell cycle.-**Prophase**: formation of the mitotic apparatus-**metaphase**: alignment of the centromeres- **anaphase**: separation of the chromatids – **telophase**: reformation of the nuclei -Molecular organization and functional role of the mitotic apparatus- The Spindle-Centromere-Anaphase chromosome movement-Hypothesis about the mechanism of chromosome movement.-Significance of mitosis. **Cytokinesis (C): actual division of the cell-** cytokinesis in animal cells, plant cells, fungi and protista.

Practicals (36Hrs)

1. To prepare molar, molal, normal and percent solutions.
2. Qualitative test for carbohydrate, aminoacid and protein
3. Quantitative test for sugar in a given solution
4. Quantitative test for sugar in biological samples
5. Estimation of protein and DNA
6. Chromatographic methods for the separation of macro and micro molecules
7. To Make acetocarmine squash preparation of onion root tips and to identify different stages of mitosis

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Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Plant Science -Theory Model Question Paper

Core-4

THE ORIGIN OF LIVING THINGS- BIOMOLECULES AND CELL BIOLOGY

Course Code: 4B04PLS/BOT

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; each bunch carries a weightage of 1)

1. Choose the correct answer

i) Which of the following shows the correct heirarchy in the molecular organisaton of cells

(a)Metabolic inter mediates-Building blocks-Macro molecules-Supra molecular assemblies

(b)Organelles--Building blocks- Macro molecules-Precursors from the envirnment

(c) Precursors from the environment- Metabolic inter mediates-- Macro molecules-Building blocks

(d) Building blocks- Macro molecules-Precursors from the environment-Supra molecular assemblies

ii) No cell is known to be without

a) Mitochondria
b) Chloroplast
c) A well defined nucleus
d) Ribosome

iii) The size of Mitochondria is

a) 5 - 20μ,
b) 50 -100 μ
c) 0.5 – 1.0 μ
d) 150-300 μ

iv) Which structure alone cannot be observed with light microscopy?

a) Vacuole
b) Microfilament
c) Cell wall
d) Plastid

2 .

i) Which of the following gases was not prevalent in abundance in the atmosphere of early earth, but became more prevalent after living organisms (mostly phototrophs) evolved?

a.) oxygen b. nitrogen c. methane d. ammonia

ii)The cytoskeleton of a cell is comprised of:

(a) cell wall and membranes
(b) nucleus and cytoplasm
(c) microtubules and microfilament
(d) intrinsic and extrinsic proteins

iii). Which chemical below would you not find in a phosholipid?

a) C
b) O
c) H
d) N

iv) Which are the most diverse molecule in the cell

(a)carbohydrates
(b) protein
(c) lipids
(d) Mineral salts

3. State true or false

i) Klinefilters syndrome is due to the addition of one extra chromosome to the normal cell.
ii) Sucrose is not a reducing sugar
iii)Celulose and amylase are made up of glucose monomers
iv) Ribosome is a non-membrane organelle:

4. Fill in the blanks

i) The number of chromosomes in Drosophila melanogaster is ---------
ii) When there are 2n+2 chromosome in a cell ,the condition is known as ----------
iii) Bond angle of H-O-H is ----
iv) The glycosidic bond involved in the branch point of amylopectin is…..

5. Rearrange column B and C to match column A

	A	B	C
i)	polysaccharide	carbon, hydrogen, oxygen	nucleotide
		as enzymes, hormones, pigments	
ii)	fat	carbon, hydrogen, oxygen, nitrogen, phosphorous	amino acid
		directs protein synthesis	
iii)	protein	carbon, hydrogen, oxygen in a 1:2:1 format	glucose
		immediate source of chemical energy	
iv)	nucleic acid	hydrogen, oxygen, carbon, nitrogen,occasionally sulfur	glycerol
		comprise parts of membranes, reserve source of chemical energy	

Section B

Compare and contrast any four: (Each question carries a weightage of 1)

6 NAD and FAD
7 Reducing and Non reducing sugar
8 Sphingo lipids and phospho lipids
9 Paracentric and pericentric inversion
10 Primary and secondary cell walls.
11 Eukaryotic and prokaryotic cell.

Section C

(Short answer questions. Answer any seven; each question carries a weightage of 1)

12. Describe the general structure of a nucleotide
13.What are terpenes chemically, and how are they synthesized? Give one example each of mono- and triterpenes that serve as feeding deterrents to insects.
14. Classify aminoacids based on polarity
15. Living things are composed of lifeless molecules.But they show extra ordinary attributes not shown by inanimate matter. comment on the molecular logic of the living state.
16. For a species with a diploid number of 18, indicate how many chromosomes will be present in the somatic nuclei of individuals who are haploid, triploid, tetraploid, trisomic and monosomic
17. What are the basic points of A.I. Oparin's idea concerning the origin of the Universe/Solar System?
18. Give an account of the organisation of interphase nucleus
19. Compare the components of ribososomes in prokaryotes and Eukaryotes..
20. How is cyclic AMP formed and why is it important in the cell?

Section D

Short answer questions. Answer any five; each question carries a weightage of 2.

21) Compare and contrast the particulars of the early earth and the current earth with respect to the types of molecules that were prevalent, Why is early earth sometimes described as a "nitrogenous or primodial soup. List two experiments to show that life could have originated from inorganic components
22)Draw the metaphase and anaphase stages of mitosis of a species with the data given below.2n= 6, in which one pair of chromosome is metacentric,one pair telocentric and one pair submetacentric. The A,B and C loci each segregating a dominant and recessive allele(A and a, B and b, C and c) are each located on different chromosome pairs.
23). Draw a diagram of a higher plant chloroplast labeling the inner and outer envelope membranes, the thylakoid membranes, the stroma and the grana stacks. Indicate which membranes contain proteins of the photosynthetic electron transport chain and proteins associated with ATP synthesis.
24)Explain the morphology and chemical organization of chromosome.

25)Mitosis is the mere seperation of an already duplicated cell. Evaluate the statement.

26) Discuss the main functions of secondary metabolites in plants and relate these functions to the sites of accumulation of secondary compounds in the plant.

27)Draw and label a diagram of a biological membrane which illustrates the fluid mosaic model of membrane structure. Clearly indicate the phospholipids, the hydrophilic head groups, the lipophilic tails, intrinsic proteins, extrinsic proteins, attached carbohydrate moieties .

Section E

(Essay type question. Answer any one; each question carries a weightage of 4)

28) Distinguish between the primary ,secondary and tertiary structure of protein . Discuss the role of bonds in stabilising protein structure

29) Outline the ultrastructure of cell wall.How can you distinguish between the major components of plant cell walls: cellulose microfibrils, pectins, and hemicelluloses? Give examples of the types of molecules that make up each of these major structural components, and how they are arranged in the cell wall. Cite three distinct functions of plant cell walls

30) Give an account of the origin and evolution of biomolecules, cells and the early life

SCHEME OF QUESTIONS

	Multiple choice 1	Fill in the blanks1	True/ false1	Match the following1	Short answer weightage 1	Short answer weightage1	Short essay weightage2	Essay weight-age 4
Knowledge	6	4	4		2	2	1	1
Comprehension	1					3	1	1
application						1	1	
analysis	1				4	1	3	1
synthesis				1		1		
evaluation							1	

B.Sc. Plant Science/Botany

CORE-5

ENERGY AND INTERMEDIARY METABOLISM

Course Code: 5B05PLS/BOT
No. of credits- 2
No. of contact hours- 36+18

Aim of the Course
To understand the interrelationships existing between metabolic pathways

Course Outline

Module-1 Dynamics of Energy Transformation 9hrs

The laws of thermodynamics describe how energy changes- Bioenergetics and thermodynamics-Entropy-Free energy change and equilibrium constant-Activation energy-Phosphate group transfer-Biological oxidation–reduction reactions - flow of electrons.-Energy currency of life -Discovery and structure of ATP-High Energy phosphate Bond - Hydrolysis of ATP-ATP-ADP Reactions-ATP-ADP-AMP interactions.Role of ATP in Biological reactions
Chemical life of a cell - Survey of intermediary metabolism- anabolic-catabolic-amphibolic pathways-Interrelationship of metabolic pathways-Regulation of metabolism
Enzymes-biological catalysts-General properties- nomenclature-Substrate specificity - cofactors and co enzymes-Enzyme kinetics-mechanism of Enzyme action-Factors influencing rates of Enzymatic reaction-Effect of PH on enzyme activity-substrate concentration-temperature- Enzyme inhibition-competitive and non competitive inhibition-Allosteric regulation of enzyme activity-Pathways of discovery-J.B.S.Haldane and Enzyme action(Ref.Voet ,voet& pratt 2nd Edn :363)

Module -2 Capture of energy (9Hrs)

Photosynthesis- Milestones in the history of photosynthesis – the chloroplast as a photosynthetic machine- role of soil and water-role of light and reducing power-pigments capture energy from sunlight-The biophysics of light- Light phase of photosynthesis-Absorption spectra and pigments- chlorophylls and carotenoids- Photochemistry and transfer of excitation energy-phosphorescence and flourescence- Action Spectra-photosystems-photosystems convert light to chemical energy- Photophosphorylation-cyclic and non cyclic-Electron transport-Redox potential of the electron carriers.

Calvin cycle-cells use the energy and reducing power to make organic molecules-Carbon Dioxide Fixation and Carbohydrate Synthesis- Products of carbon dioxide fixation-Pathways of Discovery-Exploring the path of carbon in photosynthesis-(1)JamesA.Bassham(2)MelvinCalvin(Ref.Plant physiology; Salisbury and Ross;4e) The C-4 Dicarboxylic pathway-Some species fix CO2 differently-Photorespiration-CO_2 fixation in

succulent species(Crassulacean acid metabolism)-formation of sucrose,starch and Fructans.Factors influencing photosynthesis

Module 3 - Plants and nitrogen metabolism 6hrs

Biological Nitrogen fixation-symbiotic and a symbiotic-Biochemistry of nitrogen fixation-Assimilation of nitrate and ammonium ions-Biosynthesis of amino acids-Reductive amination and Transamination- GS/GOGAT Pathway-Control of amino acid synthesis.

Bosynthesis of saturated fatty acids in plants-glyoxylate cycle.

Module-4 - Release of Energy 12hrs

Respiration- Stage 1-Glycolysis and formation of pyruvic acid-**Stage 2-**oxidation of pyruvate-Formation of Acetyl CoA- **Stage 3-** The Citric acid Cycle- Pathways of Discovery-Hans Krebs and the citric Acid cycle-Energetics of Glycolysis,The Citric Cycle and the Electron transport system- Regulation of citric acid cycle- amphibolic nature of citric cycle-The pentose phosphate pathway-Glyoxylate pathway-A Short circuit of the Krebs cycle. **Stage 4-** The electron transport System and oxidative phosphorylation in mitochondrion. Electron carriers function as multi enzyme complexes-ATP synthesis-Chemi osmotic theory-pathways of Discovery:Peter Mitchell and the chemiosmotic theory – summarizing the yield of Aerobic Respiration.

Catabolism of proteins and fats can yield considerable energy

Cellular respiration of fats-Oxidation of fatty acids- activation of fatty acids-Transport across the mitochondrial membrane-β oxidation of saturated fatty acids.

Cellular respiration of proteins- Oxidative degradation of Amino acid- The Flow Sheet of aminoacid Oxidation- Pathways leading to acetyl CoA and entry into TCA cycle.

Secondary Metabolism- Link Between primary and secondary metabolism

Cells can metabolize food without oxygen –fermentation-ethanol- lactic acid.

The stages of cellular respiration evolved over time; The evolution of metabolism-degaradation→glycolysis→anaerobic photosynthesis→oxygen-forming photosynthesis→ Nitrogen fixation→aerobic respiration.

PRACTICALS (18Hrs)

1. Extraction of invertase (from any source)
2. assay of invertase
3. pH dependent activity profile of enzymes
4. Calorimetric estimation of reducing sugars in germinating seeds
5. Demonstration of Hill reaction
6. Separation of leaf pigments by paper chromatography/Column chromatography/ TLC
7. Effect of light intensity on photosynthesis by Wilmot's bubbler
8. Kuhnes fermentation experiment

9. Respirometer experiment
10. Experiment to show anaerobic respiration

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Code: Reg. No:

Name :

KANNUR UNIVERSITY EXAMINATION

Plant Science-Theory Model Question Paper

5B05PLS/BOT - **ENERGY AND INTERMEDIARY METABOLISM**

Time: 3 Hours **Weightage: 30**

Section A

(Objective questions (Multiple choice /one word/sentence/ fill in the blanks /Match the following, true or false etc.) in cluster of four. Each cluster carries a weightage of 1

1. Choose the Correct Answer

i) The conversion of pyruvate to oxalo acetate is likely to require which of the following co-enzymes?

(a)Biotin (b)Vit B12 (c)Thiamine pyrophosphate (d)Pyridoxal phosphate

ii) Redox potential value (E_0) of NAD/NADH system is

a) -0.1V (b)+0.1V (c**)** -0.32V (d)+0.32V

iii)Which of the folowing is not a component of mitochondrial electron transport?

(a)Ubiquinone (b) Cytochrome b_6 (c) Cytochrome c (d) cytochrome a_3

iv) In photosynthesis, dark reaction or black mans reaction is

a) Enzymatic and occur in absence of light

b) Non Enzymatic and occur in the absence of light

c) Enzymatic and independent of light

d) Enzymatic and occur in the presence of light

2

i)The oxidation of a molecule of palmitic acid, $CH3(CH2)_{14}CO_2H$:

(a) yields 8 molecules of acetyl-CoA and some ATP and water

(b) yields 16 molecules of acetyl-CoA only

(c) yields carbon dioxide and water only

(d) uses more ATP than it generates

ii)The Km Value of an enzyme(Michaelis constant) for a substrate is defined as

(a)Half the substrate concentration of which the reaction rate is maximal

(b) The substrate concentration of which the reaction rate is halfmaximal

(c) The dissociation constant of the enzyme –product complex

(d)The dissociation constant of the enzyme –substrate complex

iii)Co enzymes are --- organic compounds

a) non protein b)protein c) lipoprotein d)all of the above

iv) The emission of phosphorescent radiation is slow due to

(a)Singlet ground state to triplet excited state transition is forbidden

(b)Triplet excited state to singlet ground state transition is forbidden
(c)Singlet excited state to triplet excited state transition is forbidden
(d) Both (b) and (c)

3. **State true or false**

i) The synthesis of glucose from lactate or glycerol is called glycolysis
ii) Phaeophytin is a chlorophyll in which central Mg atom is replaced by hydrogen
iii) Assimilation of nitrogen by plants is exclusively by ammonia.
iv) Light reaction takes place during day time and dark reaction in night

4 **Fill in the blanks**

i) Photorespirationis otherwise called as c2 cycle because----------
ii)RUBISCO is---------
iii)Initial acceptor of carbondioxide in CAM cycle is-------
iv) The glycosidic bond involved in the branch point of amylopectin is-

5. The following are nobel prize winners in photosynthetic research .Rearrange column B and C to match column A .

i)	Total synthesis of chlorophyll	Melvin Calvin	1978
ii)	Elucidation of enzymatic mechanism underlying the synthesis of adenosine triphosphate (ATP).	Paul D. Boyer and John E. Walker	1965
iii)	Oxidative and photosynthetic phosphorylation: chemi-osmotic theory	RobertBurnsWoodward	1997
iv)	Carbon-di oxide assimilation in photosynthesis	Peter Mitchell.	1961

Section B

Answer any four questions. (Each question carries a weightage of 1)

6. Can ATP synthesis take place in thylakoid membranes kept in the dark? Explain your answer.
7. The net equation for oxidative phosphorylation can be written as
   $2NADH+2H+ +O2$------$2H_2O+2NAD$
   Write an analogous equation for the light reactions of photosynthesis
8. Sachs found that the leaves lose more weight during night when they are attached to the

plant than they are excised. Explain why?

9. The term "dark reactions" was used for many years to describe the reactions for incorporating CO_2 in photosynthesis. Do you think that the term is inappropriate now?
10. Rate of photosynthesis is higher in intermittent light than in continuous light . Evaluate.
11. Cite two instances of the application of radioactive isotopes in the study of metabolic process in plants

Section C

(Short answer questions. Answer any *five;* each question carries a weightage of 1)

12. What are terpenes chemically, and how are they synthesized? Give one example each of mono- and triterpenes that serve as feeding deterrents to insects.
13. Traced out the pathway by which Calvin explored the path of carbon in photosynthesis
14. Comment on the amphibolic nature of citric acid cycle.
15. Differentiate competitive and non competitive inhibitors
16. Write on the role of ATP in biological reactions.
17. What is GS/GOGAT pathway?
18. Write a note on the regulation of citric acid cycle

Section D

Short answer questions. Answer any *six; e*ach question carries a weightage of 2.

19. Compare and contrast photophosphorylation and oxidative phosphorylation
20. What is β oxidation?Elucidate β oxidation of fatty acid.
21. What is an action spectrum? What is the relationship between the action spectrum for photosynthesis and the absorption spectrum of chlorophyll?
22. Discuss the main functions of secondary metabolites in plants and relate these functions to the sites of accumulation of secondary compounds in the plant
23. Summarise chemi osmotic coupling theory.
24. What is phosphorescence? Trace the Photochemistry and transfer of excitation energy in photosynthesis.
25. Explain the biochemistry of nitrogen fixation.
26. Give an account of the carbon dioxide fixation in succulent species.

Section E

(**Essay type question. Answer any one; each question carries a weightage of 4)**

27. Explain the process of root nodule formation in leguminous plants infected by rhizobium. Give a detail account of the biochemistry of nitrogen fixation.
28. Describe the different steps whereby a molecule of glucose is oxidized to CO_2 in glycolysis and the citric acid cycle. In what steps is CO_2 released, and in what steps is energy conserved?
29. Give a detailed account of enzyme classification

B.Sc. Plant Science/ Botany

Core-6

GENETICS AND MOLECULAR BIOLOGY

Course Code: 5B06PLS/BOT
No. of credits- 4
No. of contact hours- 72+36

Aims and objectives

1. Enable students to understand the current trends in genetics.
2. Make student aware of the historical process through which modern genetics evolved.
3. To orient them in such a way that they will be able to apply the knowledge of classical and molecular genetics in agriculture, medicine, research and industry.
4. To create interest and develop appreciation in the tremendous growth of genetics and how it is suitable for defining and understanding nature .
5. Gives an insight into the science of heredity.
6. Helps to understand the basic concepts of Molecular and classical genetics.
7. Lead the students into specialized programmes, in higher studies, in the field of biotechnology and molecular biology.

Course Outline

Module-1 (5Hrs)

Introduction to the science of Genetics -The science of genetics-classical and modern approaches:-Genetics has an interesting and rich history-Pre historic times-The greek influence-Before1860; 1860-1900; 1900-1944; 1944-present - A brief overview of classical, molecular and evolutionary genetics.- Basic concept of genetics-scope of genetics-genes and organism-gene transmission-Genetics has a profound influence on society- Eugenics and Euphenics-genes and environment.

Meiosis and sexual Reproduction

General Description of Meiosis-unique features-The first meiotic division-The second Meiotic Division- Genetic consequences of meiosis and types of meiosis-Meiosis in plants - The development of gametes varies during spermatogenesis and oogenesis –cell biology of fertilization.—significance of meiosis.

Module2- Mendel solved the mystery of heredity (9hrs)

Mendel's experiments-law of segregation and independent assortment of characters. Genes and Homologous chromosomes-Independent assortment and genetic variation- **Pathway of discovery**-Mendel's lecture to the natural history society of Brunn on the findings in1865 - unrecognized -. Excerpts from Mendel's original paper-.The Re Discovery and Re interpretation of Mendel's working 1900- Statistical Probability and Mendelian genetics-Hypothesis testing-Chi-square analysis (goodness of fit test)- Human genetics follows Mendelian principles.-pedigree analysis- Symbols of Pedigree, Pedigrees of Sex-linked & Autosomal (dominant & recessive)

Mendelian Genetics and sexual cycle in plants. (Alternation of generations-Haploid-Diploid).

Module 3- Gene interactions (9hrs)

Allelic interactions-co dominance and incomplete dominance-Multiple Alleles-albino Series in Rabbits-ABO Blood group in man-Self Sterility in tobacco; Lethal alleles-Coat color in mice-albinism in corn; **Non allelic interaction**-Comb pattern in fowls-(9:3:3:1); **Epistasis**-Coat color in mice 9:3:4-Fruit colour in summer squashes-12:3:1; complementary genes Flower color in lathyrus-9:7-Inhibitory factor-leaf color in paddy-13:3; Duplicate genes-shepherd's purse-15:1-duplicate genes with
cumulative effect-9:6:1: Pleotropic genes

Quantitative inheritance- Polygenes-General Characters- Quantitative inheritance in human beings-skin colour,IQ and other traits.Ear size in corn.Transgressive variation-Heritability-Phenotypic expression-penetrance and expressivity

Module-4 -Linkage, crossing over and chromosome mapping (5hrs)

Linkage -crossing over-Mechanism of crossing over-cytological demonstration of -
Linkage V**s** Independent assortment - complete and incomplete linkage- crossing over-(Maize and Drosophila)-Chromosome Mapping-Two point and three point test cross-Determining the gene sequence-Interference and coincidence- **Path way of discovery**-The First Chromosome Map by Alfred H. Sturtevant

Module 5 (6hrs)

Sex Determination and sex linked inheritance

Determination of sex-sexchromosomes-Chromosome theory of Sex determination-Heterogametic males and Females. Dosage compensation –Lyon Hypothesis-Sex determination in plants-Genic balance theory.

Sex linked Inheritance-X linked inheritance-eye color in Drosophila-Haemophilia in man-Y-Linked inheritance-Sex limited and sex influenced traits.

Extra chromosomal inheritance-Maternal influence-Coiling of shells in snails

Pigment in flour moth -**Organelle Heredity-Chloroplast**; Variegation in Four o' clock plant-**Mitochondria:** Poky in neurospora.

Module-6 Molecular Biology (11Hrs)

A brief overview of molecular biology.; The encounter between biochemistry and genetics-**Pathway of Discovery:**Origin of cells from Concentrated solution of organic compounds-J.B.S.Haldane and A.I.Oparin- Experiment by Stanley Miller- Genes are DNA. In search of the genetic material- historical perspective-Evidence for DNA as genetic material, direct and indirect evidences (Griffith, Avery, Mc Leod, Mc Carthy, - transformation studies – Hershey-chase experements transfection experiment)-Chargaff's rules-The double helix- Watson and Crick model of DNA -**Pathway of discovery**- Rosalind Franklin and discovery of DNA - Alternate Forms of DNA-A,B and Z form of DNA- DNA replication-Meselson and Stahl Experiment -Enzymology of DNA replication – Replication apparatus.-Mechanism of

Replication -continuous and discontinous -Bidirectional replication- DNA Synthesis invitro- **Pathway of discovery-**Arthur Kornberg and DNA polymerase-1 -RNA-Strucure and composition of tRNA (clover leaf model) mRNA and rRNA.

Concept of gene - History of the DNA world is written in gene sequences-Gene and Cistron-Evolution of the gene concept.-**Pathway of Discovery (**1**)** Beadle and Tatum's experiments with Neurospora- (2)Archibald Garrod -Inborn errors in metabolism-Units of gene-cistron, recon and muton- One cistron-one polypeptide concept.

Pathway of discovery-One gene –one enzyme hypothesis by Beadle and Tatum

Module-7 Gene Expression (9Hrs)

Transcription- DNA dependent synthesis of RNA. RNA polymerases-. initiation, elongation and termination of RNA synthesis-.RNA processing in prokaryotes and Eukaryotes-Transcription and RNA processing. The interrupted Gene.Introns –Exons-Exon Shuffling-RNA Editing **-Pathway of Discovery**-Richard Roberts and Philip Sharp and the discovery of introns- Exons corresponds to the functional domain of proteins.-Introns can be precisely deleted from DNA. .How did interrupted genes evolve?- overlapping Genes- **Genetic code**-Universality,Triplet binding and reading Frame-anticodons ,degeneracy and wobble in the code -Codon- tRNA interaction- **Pathway of Discovery**-Nirenberg and leder experiment-Nirenberg and Matthaei experiment- **Translation**-Protein synthesis-Activation of aminoacids – initiation, elongation, termination and release - special signals of termination.- protein folding and post translational processing

Module-8- Gene Regulation (9Hrs)

Molecular organization of promoters in prokaryotes and Eukaryotes- **Gene regulation in prokaryotes -** Operon concept(lac,his,trp ara operon)- Genetic control of lysogeny and lytic cycle in phage lamda bacteriophages - **Genetic regulation in Eukaryotes -**

different from prokaryotes-various levels of regulation-Transcriptionally active and inactive form of chromatin-Modification and accessibility of DNA-Role of promoters in Eukaryotic gene regulation.

Module -9- (9hrs) Mobile genetic elements - General account - Characteristics-Transposons (Tn) and insertion sequences (Is) - Basic components of bacterial Transposons.-Mechanism of transposition.-Retrotransposons-LINES and SINES

Oncogenes and cancer -Cellular oncogenes-Tumour suppressor genes

Gene Mutation- General –Types of mutation- . Detection of mutation- .Molecular basis of mutation- Transition, Transversion and Frameshift mutation-tautomeric shift- alkylating agents-Base analogues- DNA Repairing Mechanism- mutagenic agent

Practicals 36 hrs

Meiosis- To make smear preparations of the flower buds of any one of the following Plants- Rhoeo, Tradescantia, Capscicum, Coix

Genetics problems

1. Dihybrid inheritance
2. Allelic and Non allelic Gene interactions.
3. Chromosome mapping (two-point and three point crosses),
4. Chi square analysis
5. Probability factor in Genetics

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29. William Hexter and Henry T.Yost,Jr.(1977) The science of Genetics
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Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION
Theory Model Question Paper

Course Code: 5B06 PLS/ BOT
GENETICS AND MOLECULAR BIOLOGY
Time: 3 Hours **Total Weightage: 30**
Draw diagrams wherever necessary

Section - A
Answer ***All***
(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct Answer

i) Which of the following statements defines a gene most precisely?

a) A gene is a fragment of DNA that codes for the production of a phenotypic trait

b) A gene is a fragment of DNA that codes for the production of a polypeptide or polynucleotide.

c) A gene is a fragment of DNA that codes for the production of a protein.

d) A gene is a fragment of DNA that comprises a unit of inheritance

ii) A man who is affected with phenylketonuria marries a woman who is heterozygous at that locus. What is the probability that their first child will have phenylketonuria?
(a)1/8 (b)1/4 (c)1/2 (d)3/4

iii) The first event in the translation is the binding of the mRNA leader to the
a)Smaller ribosomal subunit
b) Larger ribosomal subunit
c) Polysomal core
d) tRNA

iv) Which is the correct sequence according to the increasing molecular weight?
a) tRNA→ DNA→ rRNA
b) rRNA→ DNA→ tRNA
c) DNA→ rRNA→ tRNA
d) tRNA→ rRNA→ DNA

2 i)What would be the frequency of AABB individuals from a mating of two AaBb individuals?
(a) 1/64 (b) 1/32 (c.) 1/16 (d.) 1/8

ii) Which of the following is not an event that occurs during the first division of meiosis:
a) replication of DNA,
b) pairing of homologous chromosomes,
c) formation of haploid chromosome complements,
d) crossing over, or separation of sister chromatids

iii) Which of the following statements about heritability are true?
a.) is a measure of level of gene linkage
b.) is a measure of inbreeding
c.) is a measure of proportion of repeated DNA in an organism
d.) is a measure of the proportion of variation that is due to genetic causes

iv) In a collection of gametes from a heterozygote(AaBb), 10 out of 50 are recombinant for the a and b genes. How far apart are genes a and b?
a)80mμ b)20mμ c)10mμ d)cannot be detected

3. **State true or false**

i) Semi conservative mode of replication of DNA was proved by Watson and Crick
ii) RNA polymerase and DNA polymerase are required for DNA replication
iii) Sister chromatids separate and segregate to opposite poles duringMeiosis-1
iv) Maize has 10 pairs of chromosomes. Linkage group present in it are 20

4. **Answer in one word or in one sentence**

i) An intercalating dye used to detect nucleic acid when viewed under uv light is--------
ii) The term to define gene as a unit of genetic function, a region of DNA which encode a specific product is known as--------
iii) What molecule bears the anticodon?
iv) Y-linked genes are otherwise called ----------

5. **Rearrange column B and C to match column A**

i)	Co-linearity of genes and enzymes	Barbara Mclintock	1877
		George Beadle	
ii)	Genes	T.H.Morgan	1911
		Gregor Mendel	
iii)	Linkage	Yanofsky	1937
		H.G.Khorana	
iv)	Crossing over	Johannsen	1967
		Griffith	

Section B

. **Distinguish between any four of the following: (Each carries a weightage of 1)**

6.a) hn RNA and mRNA
b) monocistronic mRNA and polycistronic mRNA
7.Wobble hypothesis and Degeneracy of the genetic code
8.Transposons and retrotransposons
9. a) promoter and termination codon
b) missense mutant and nonsense mutant
10. photo reactivation and excision repair
11.Replication and Transcription

Section C

(Short answer questions. Answer any *seven;* each question carries a weightage of 1)

12) UV light causes thiamine dimerisation. Describe the mechanism, in order of efficiency that can repair the damage. Name the enzymes involved?
13) Determine the sequence of both strands of DNA from which the RNA shown belo was transcribed. Indicate the 5′ and 3′ ends of the DNA with an arrow and show which strand was transcribed?

5′ CCAUCAUGACAGACCCUUGCUAACGCA3′

.
14)A double stranded DNA molecule is 30% adenosine (A)
a) what is the complete base composition of this molecule?
b)Answer the same question ,but assume the molecule is double stranded RNA

15)In the ABO blood system in human beings ,alleles I^A and I^B are co dominant and both are dominant to the I allele . In a paternity dispute, a type AB woman claimed that one of four men, each with different blood types, was the father of her type A child. .Which of the following could be the blood type of the father of the child on the basis of the father of the evidence given?
a)TypeA
b) Type AB
c)Type O
d)Type B

16) Explain why linkage is a violation of Mendels law of independent assortment of genes
17) List all enzymes that participate in the transcriptionand translation process
18) Draw the tautomeric formof adenine and cytosine
19) List the ways in which the behaviour of chromosomes during meiosis correlates with the behaviour of genes during gamete formation
20) Asssume, Mendel made the cross of two true breeding plants that differed in all dominant traits, the other with all recessive traits. What would the ratio of phenotype be in the F2 generation?
You are a given an angiosperm, moss and a pteridophyte .Which among them will you

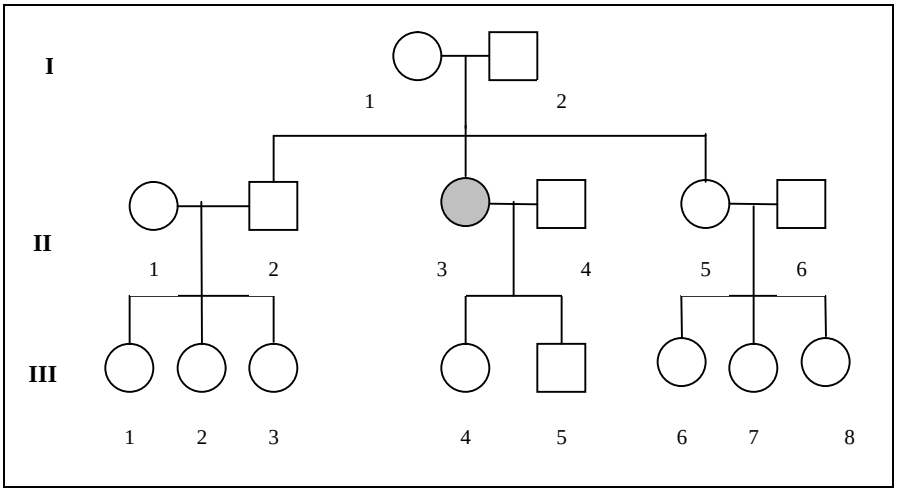
choose as your experemental organism for studying mutation genetics .why?

Section D

Short answer questions. Answer any *five; e*ach question carries a weightage of 2.

21). In the following pedigree chart what is the probability of the following persons are of genotypeAa?

1 111-6
2 111-4
3 111-8



22)Can two mulatoes have white skinned offspring? Can two white skinned people have dark skinned offspring? Explain.

(23) In Drosophila, crosses of Dichaete winged fliesXDichaete always give two thirds Dichaete to one third normal winged offspring.DichaeteX normal gives one half Dichaete and one half normal. How would you explain these results?

24)Assume that the difference between a type of wheat yielding about 4gm plant and one yielding 10 is due to three equal and cumulative multiple factor pairs,AABBCC, cross one type with the other. What will be the phenotype of the F1; of the F_2?

25)Diagram the relationships of the three types of RNA at a ribosome. Which relationships make use of complimentarity?

26). In the following problems on blood groups determine the genotypes of the parents?

a) One parent is groupA and the other groupB, but all four groups are represented among children.

b) Both parents are groupA, but three fourths of the children belong to groupA and one fourth to groupB

c) One parent is AB and the otherB, but of the children one fourthA,one fourthAB and one half B.

27) Contrast the need for the enzymes involved in the metabolism of lactose and tryptophan in bacteria in the presence and absence of lactose and tryptophan respectively.

Section E

(**Essay type question. Answer any one; each question carries a weightage of 4)**

28) Summarise the central dogma of molecular biology and explain how mutation in DNA can alter a protein.

29) How can you distinguish extra chromosomal inheritance from a case of autosomal inheritance and sex linked inheritance? Explain.

30) Briefly analyse the important advance in gene theory contributed by each of these groups: Mendelian geneticists, cytogeneticists, one gene one enzyme groups, The DNA structure and replication investigators and the analysers of gene regulation.

	Multiple choice weightage 1	Fill in the blanks weightage 1	True/false weightage 1	Match the following1	Short answer weightage 1	Short answer weightage1	Short essay weightage2	Essay weightage 4
knowledge	1	1	1	1		2(12)(13)		1
comprehension						1 (11)		1
application	3					3(9)(10)(15)	3	
analysis	3				4	2 (8)(14)	1	1
synthesis						1 (7)	1	
evaluation							2	

B.Sc. Plant Science/ Botany

Core-7

EVOLUTION, PALEONTOLOGY AND PLANT BREEDING

Course Code: 5B07PLS/ BOT
No. of credits- 3
No. of contact hours- (54+18)

Aim and Objectives

1) To understand nature and the evolution of life
2) To enable them to investigate the evolutionary phenomena with out prejudices rather than reaching into hasty conclusions.
3) To enable them to correlate the origin and evolution of life and how genetic studies contributed in understanding evolution.
4) To understand the chronological events those have taken place in the history of earth with the help of fossil studies.
5) To appreciate how the knowledge of evolution helped plant conservation and improvement.

Module 1 **5hrs**

Introduction

Why study evolution? Interfering the history of life. Origin of life-organismal evolution. Theories about the origin of life. Origin of Eukaryotes – Mitochondria and endosymbiotic theory.-Origin of Plants – Chloroplast and endosymbiotic theory

History of Development of Evolutionary Principles -Lamark, Weisman and De Vries, Darwin- Wallace- Neo-Darwinism- Modern concepts of evolution.

Module 2 - The Mechanisms of Evolution. **11hrs**

Genetic changes leads to evolution and the origin of bio diversity

Mutation and Evolution- Polygenic inheritance –heritability and selection- Polyploidy and Evolution, Hybridization and Evolution

Population Genetics:Process that change allelic frequencies- Gene Frequencies in population, Gene pool and Gene frequencies;Equilibrium of Gene frequencies and Hardy-Weinberg law-Changes in Gene Frequencies-Mutation, selection, migration, genetic drift, non-random mating.

Natural selection and Evidences of evolution

Natural selection can produce evolutionary change- Darwins finches,industrial melanism, artificial selection. Fitness-effects of selection –adaptation- Micro and macroevolution

Evidences from other fields of biology -radiometric dating- the fossil record-gaps in the fossil record-Gradual vs. abrupt change- mass extinction .

Module 3 **6hrs**

Origin of species

Species are the basic unit of evolution- species maintain their genetic distinctiveness through barriers to reproduction.-Clustures of species reflect rapid evolution**.**

Evolution and speciation -Mechanism of cladogenesis- Reproductive isolation.

Allopatric,parapatric and Sympatric speciation- Genetic variation- genetic polymorphism

Module 4 **5hrs**

Evolution of genomes

Evolutionary history is written in genomes- comparative genomics-Origin of genomic differences–same gene, new function-different genes, convergent function-functional genomics

Module 5 **11hrs**

Diversity of life on earth.

.Systematics and the phylogenetic revolution-Biologist name organism in a systematic way.-classification.Reconstructing and Using Phylogenies-evolutionary relationship.

All living organisms are grouped into categories- Molecular phylogenetics**:** Phylogeny – Construction of Phylogenic trees based on biomolecules – Evolutionary classification based on aminoacid sequences, Quantitative DNA measurements, Repetitive DNA sequences, restriction enzyme sites and nucleotide sequences.

Evolution and plant diversification –an overview -Early plant life –the algae.-origin and evolution of land vascular plants- Angiosperms - the culmination of plant evolution.-The main line of plant evolution. Evolution –Retrospect and prospect.

Module 6- Paleontology **9 hrs**

Objectives of palaeo botany- Fossil formation-Theories- Types of fossils. impressions, compressions, casts, molds and pertrifactions and radio carbon dating. Techniques for studying fossils- Geological time scale- Evolutionary trends- Fossil bryophytes- pteridophytes , Gymnosperms and Angiosperms- Applied aspects of Palaeobotany- Palaeopalynology, Exploration of fossils fuels, Radiocarbon dating,-Brief study of the following fossils- Rhynia, Lepidodendron, Lepidocarpon, Lyginopteris.

Module 7- plant breeding **9 hours**

Plant breeding- History; Genetic resources- centres of diversity and origin of crop plants

Introduction and Objectives of Plant Breeding ; Domestication, Plant Introduction and Acclimatization- Methods of Breeding; Selection, (Mass, Pureline and Clonal), Hybridization, Heterosis, Polyploidy breeding and Mutation breeding – Achievements

Practical- **18hrs**

1.Fossil pteridophytes- Rhynia Stem, Lepidodendron, Lepidocarpon.

2. Fossil Gymnosperm- Lyginopteris

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5. Chamberlain C.J Gymnosperm, Structure and Evolution.
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Web pages

1. www. ucmp. Berkeley. Edn/history/evolution.htm/
2. www.bbc.co.uk/education/darwin/index.shtml
3. www. nhm.ac.uk
4. www. biologybrowser.org
5. tolweb. Org/tree/phylogeny.html

Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Plant Science- Model Question Paper

CORE – 7

5B07PLS/ BOT - **EVOLUTION, PALEONTOLOGY AND PLANT BREEDING**

Time: 3 Hours **Total Weightage:30**

Section - A

(Objective questions (Multiple choice /one word/sentence/ fill in the blanks /Match the following, true or false etc.) in cluster of four. Each cluster carries a weightage of 1

1.Choose the correct answer.

i) Which of the following is not a source of variation in a population?

a) Inherited genetic differences. b). Differences due to age.

c). Differences due to accident. d) None of the above

ii) Why, according to our reading, did Darwin take so long to publish the Origin of Species?

a). Darwin wanted to share his theory as quickly as possible once he returned from his voyage on the Beagle.

b). It took twenty years for Darwin to develop a theory.

c) Darwin suffered from a number of illnesses.

d). Darwin was concerned about the reaction of others to the implications of his theory.

iii)What's the difference between genetic drift and change due to natural selection?

a). Genetic drift does not require the presence of variation.

b) Genetic drift does not involve competition between members of a species.

c). Genetic drift never occurs in nature, natural selection does.

d) There is no difference

iv) Differential reproduction rates of various genotypes is known as

a)selection b) inbreeding c) Pureline d) introduction

2 i) The following genotypes are found in a population:

BB Bb bb
70 50 20
What are the allele frequencies of B and b?
a). B = 0.86 and b = 0.14 b) B = 0.68 and b = 0.32
c). B = 0.63 and b = 0.36 d). B= 0.32 and b = 0.68

ii) Which concept was not included in Charles Darwin's theory of natural selection?

1. survival of the fittest

2. struggle for existence
3. overproduction of offspring
4. punctuated equilibrium

iii) Which of the following gases was not prevalent in abundance in the atmosphere of early earth, but became more prevalent after living organisms (mostly phototrophs) evolved? _

a. oxygen b. nitrogen c. methane d. ammonia

iv) Working from deep geologic strata toward shallow geologic strata, what is the sequence in which fossils of these groups should make their first appearance?

1. charophyceans
2. single-celled green algae
3. bryophytes
4. plants with a dominant sporophyte

a) 3, 1, 2, 4 b) 2, 4, 1, 3 c) 2, 1, 3, 4 d) 1, 3, 2, 4

3. State true or false.

i) The theory that evolutionary change is slow and continuous is known as punctuated equilibrium

ii) . large population size, random mating, no selection, no migration, no mutation are the assumptions of Hardy Weinberg equilibrium.

iii) Variation within a pureline is heritable.

iv) Angiosperms are formed during cretaceous period.

4. Fill in the blanks

i) ---------- is considered as the father of paleobotany

ii) The theory of chemical origin of life proposed by …….

iii) Fossils of leaves are known as ……

iv) Polyploidy brings about ……. speciation.

5. Rearrange column B and C to match A

A	B	C
coenozoic	moss	$4500x10^6$
mesozoic	algae	$370x10^6$
palaeozoic	conifers	$190x10^6$
pre-cambrian	Angiosperms	$11x10^6$

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Progressive and Retrogressive evolution
7. Broad and narrow heritability
8. Micro and macro evolution
9. Isogenic lines and Purelines

10. Darwinism and Neo Darwinism
11. Polyploidy breeding and mutation breeding

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12 What is the evidence that life has evolved?

13 What are the major mass extinctions, and what are their presumed causes?What is the evidence that extinctions have created opportunities for the survivors?

14 In what ways to phyletic gradualism and punctuated equilibrium differ? Is there evidence for either or both of these models of morphological evolution? What could cause a pattern consistent with punctuated equilibrium?

15. How is radiometric dating performed to determine the age of rocks? How can this method be used to estimate the age of fossils?

16. Briefly describe the bulk method of breeding and its application.

17. Give a brief account on functional genomics

18 A.I. Oparin is credited with formulating the modern concept on the origin of life. His theory has subsequently been substantiated by scientists Stanley Miller and Sidney Fox. What are the main points in Oparin's theory?

19 How did practitioners of evolutionary systematics decide on the appropriate groupings of organisms? What are the limits of this approach?

Section D

Answer any ***Six***

(Short-essay questions; Each question carries a weightage of 2)

20 What is genetic drift? What is its cause, and how does it affect populations? What are the consequences of genetic drift? What conditions increase the strength of genetic drift? How is an allele's frequency related to the probability of fixation of that allele?

21. Discuss the role of Allopolyploidy in Plant breeding.

22. What were the major evolutionary events of the Precambrian, Cambrian, Ordovician to Devonian, Carboniferous and Permian, Mesozoic, and Cenozoic. When did the Paleozoic begin and end (and with what periods?), when did the Mesozoic end (and with what period?). What was significant about the end of the Paleozoic and Mesozoic?

23. What are the various forms of nonrandom mating? What are their effects on genetic variation in populations? How do positive assortative mating and inbreeding differ? What are the negative consequences of inbreeding?

24. In what ways can speciation occur in the absence of geographic isolation? Why is speciation via hybridization so fast?

25. Differentiate lepidodendron and lepidocarpon

26. What kinds of observations during the voyage of the Beagle led Darwin to the theory of evolution via natural selection

27**.** Discuss the scope of hybrid varieties in self pollinated crops.

28. How did changes in geological and biological views set the stage for Darwin's ideas about evolution?

Section E

Answer any **One**

(Essay- type questions; Each question carries a weightage of 4)

29 What is speciation? outline allopatric,parapatric and Sympatric speciations. In what way are the various evolutionary forces thought to be involved in the different models of speciation? What kind of evidence supports these models?

30. What is a fossil? What conditions increase the likelihood of fossilization?Briefly describe the method of calculating the age of the fossil. Describe the different types of fossils you have studied.

31 Give a detailed account of origin and evolution of plants

	Multiple choice four questions weightage 1	Fill in the blanks four questions weightage 1	True/false four questions weightage 1	Match the following (4x2)questions weightage 1 for each question	Short answer weightage 1 for each question	Short answer weightage 1 for each question	Short essay weightage 2 for each question	Essay weightage 4 for each question
knowledge	2	4	4	6	4	2	2	1
comprehension	4			2		4	2	1
application								
analysis	2					2	2	1
synthesis							1	
evaluation							1	

B.Sc. Plant Science/ Botany

CORE -8

DIVERSITY OF LIFE-1: MICROBIOLOGY, MYCOLOGY, PHYCOLOGY, LICHENOLOGY AND PLANT DISEASES

Course Code: 5B08PLS/BOT
No. of credits- 3
No. of contact hours- 54+36

Aim of the Course

To get an idea of diversity existing among lower forms of Plants.

Objectives:

1. To have a general understanding about the diverse groups of organisms.
2. To enable the student to identify the different organisms by morphological and anatomical studies.
3. To get a comparative account of plants- in its life cycle, morphology, anatomy and reproduction with an evolutionary link
4. To appreciate the fantastic commonness exists among organisms. .
5. The student will be able to appreciate the uniqueness of different groups and the way they are classified.
6. To understand the symptomology and prevention of plant diseases

Course Outline

(Questions for theory examination will cover the Types mentioned for practicals also.)

Module I- Introduction- (2hrs)

Origin and evolution of biodiversity Major categories of living organisms-kingdoms of life-six kingdoms of life by Carl Woese- 3domains of living organisms-archaea, bacteria, eukarya-characteristics and evolutionary relationship among the three domains- four kingdoms of eukaryotes--key characteristics of prokaryotes and eukaryotes- outline of evolution-bacteria→blue green algae→algae; aquatic habitat → land

Module 2- Microbiology (16 hrs + 5hrs)

Introduction to microbiology – Aims , objectives, concept, scope and significance- Koch's postulates. Bacterial classification (Brief account of Bergey's system), Major characteristics, Ultra structure of cell, reproduction, Genetic recombination in Bacteria – Brief account only .General characters of Actinomycetes, Mycoplasma, Rickettsiae, Archaebacteria and Cyanobacteria -Economic importance of bacteria with special reference to industry, medicine, Agriculture and environment - Harmful microbes: Virus - classification, Nomenclature, RNA and DNA Viruses – structure, properties and reproduction of TMV, Bacteriophages and HIV. - Economic importance.-Agricultural Microbiology-Role of microbes in soil fertility, symbiotic microbes and crop production, microorganisms as biofertilizers, mycorrhiza and biopesticides –Brief account only: Food microbiology- Food spoilage and food preservation.: Aquatic

microbiology –Source of water, water contamination, standard of water - testing. suitability of water, importance of aquatic microbes, methods of water purification, microbiology of sewage or waste water, methods of waste water treatment..

Practicals (5 hrs)

1) Micropreparation and identification of Nostoc.
2) Isolation and purification of Bacteria - Streak plate method.(Demonstration only)
3) Gram staining.
4) Isolation of Rhizobium from root nodules of leguminous Plants.
5) Study of motility by hanging drop method.
6) Identify TMV, HIV and Bacteriophages from the photographs.

Module 3- Mycology- (10 hrs + 12 hrs)

Fungi-general characters and classification (Alexopaulose *et al.* (1996)-habit and habitats-mechanism of nutrition- heterothallism and life cycle- cell structure, specialized mycelial structures, reproduction (brief account)-Economic importance- general characters and life cycle of the following groups: Mastigomycota, Zygomycota, Ascomycota, Basidiomycota, Mitosporic fungi (Asexual fungi or fungi imperfecti)- Mycotoxins and Secondary metabolites in fungi.

Practical (12 hrs)

1) Make micro preparations of vegetative and reproductive structures of the following types: Pythium, Rhizopus, Saccharomyces, Aspergillus, Peziza, Puccinia, Agaricus, Cercospora
2) Make labelled sketches of the specimens observed.

Module 4- Phycology (15 hrs + 15hrs)

Algae- introduction - thallus organization – habitats- ultra structure of cell- pigmentation evolutionary trends - classification by Fritsch-origin and evolution - symbiotic theory, variation in chloroplast structure -economic importance with special reference to soil fertility, commercial products, food and medicine, harmful role - general characteristics, structure, reproduction and life cycle of the following groups – Chlorophyceae, Xanthophyceae, Bacillariophyceae, Phaeophyceae and Rhodophyceae.

Practical (15hrs)

1) Make Micro preparation of vegetative and reproductive structures of the following types- Chlorophyceae - Chlorella, Volvox, Ulothrix, Cladophora, Zygnema, Oedogonium and Chara. Xanthophyceae – Vaucheria; Bacillariophyceae – Pinnularia; Phaeophyceae- Sargassum; Rhodophyceae- Polysiphonia
2) Make labelled sketches of Specimens observed.

Module 5- Lichenology (3 hrs + 1 hrs)

Lichens - nature of association-classification-habit and habitat- thallus morphology – internal structure –reproduction-economic importance.

Practical (2 hrs)

1) Make micropreparation of vegetative and reproductive parts of Usnea. Make sketches of the specimens observed

Module 6- Plant Diseases (8hrs +3 hrs)

Introduction- History of Plant pathology – Classification of plant diseases on the basis of causative organisms and symptoms- Host-Parasite interactions- Transmission and dissemination of diseases-Control of Plant diseases – Quarantine and Seed certification – remedial and biological control – breeding for disease resistance- Study of the following diseases with emphasis on symptoms, disease cycle and control measures - Leaf mosaic of Tapioca, Citrus canker, Quick wilt of pepper, Soft rot of Ginger, Blast disease of Paddy, Abnormal leaf fall of Rubber- Brief account of the following fungicides –Bordeaux mixture, Bordeaux paste, Tobacco decoction, Neem cake and oil.

Practical 3 hours.

1. Identify the diseases mentioned in the syllabus with respect to causal organism and symptoms.
2. Students should be trained to prepare the fungicide Bordeaux mixture and Tobacco decoction.

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Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Theory -Plant Science/BotanyModel Question Paper

Core course-8

5B08PLS/BOT - **DIVERSITY OF LIFE-1- MICROBIOLOGY, MYCOLOGY, PHYCOLOGY, LICHENOLOGY AND PLANT DISEASES**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer
   i) Floridean starch is the food product found in
      a) Chlorophyceae b) Phaeophyceae c) Rhodophyceae d) Xanthophyceae
   ii) *Rhizopus* multiplies by the production of
      a) Zoospores b) conidiospores c) sporangiospores d) chlamydospores
   iii) Many gram-ve bacteria are covered with fine hair-like appendages called
      a) Sex pili b) fimbriae c) flagella d) axial fibrils
   iv) Usnea lichen is
      a) Fruticose b) Foliose c) Crustose d) None
2. State true or false
   i) Plakea stage of *Volvox* is a tetrad
   ii) *Sargassum* plant is a sporophyte
   iii) The dikaryotic mycelium of *Puccinia graminis* is seen in Wheat leaf.
   iv) The three phases in sexual reproduction of fungi are plasmogamy, karyogamy and meiosis.
3. Fill in the blanks
   i) citrus canker is caused by _____
   ii) Agar agar is obtained from _____
   iii) The synzoospores are found in _____
   iv) Algal partner of the lichen is known as _____

4. Match the following.

	A	B
i)	Phyco erythrin	coenocytic
ii)	Fucoxanthin	Soap dish type
iii)	Frustule	Laminarin
iv)	Absence of pigment	Floridean starch

5. Answer in one word or in one sentence
   i) Name a free- swimming colonial alga
   ii) Fruit body of lichen
   iii) Who developed the staining technique for bacteria?
   iv) Name the association between fungal hyphae and roots of higher plants.

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Monera and Protista
7. Sexual reproduction in Zygomycota and Ascomycota.
8. Eukaryotes and Prokaryotes.
9. Algae and Blue-Green algae.
10. Aquatic microbiology and agricultural microbiology.
11. Wilt and Rot

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. Comment on the function of air bladder in *Sargassum*.
13. Economic Importance of Fungi?
14. Enumerate the symptoms of Quick Wilt of Pepper
15. General characteristics of bacteria.
16. Give an account of Bergey's system of bacterial classification.
17. List down your comments about the physiological relationships between the Algal and Fungal partners of Lichen.
18. Analyse the following statements and write any two statements applicable to appropriate columns given below.

Related to Algae	Related to Fungi

i) Non chlorophyllated thalloid and heterotrophic.
ii) Notorious for food spoilage.
iii) Autotrophic and chlorophyllated.
iv) Parasitic or saprophytic in habit.
v) Classified according to the colour of their photosynthetic pigments.

.Section D

Answer any *Six*

(Short-essay questions; each question carries a weightage of 2)

19. Give an account of the thallus variation found in the members of chlorophyceae with suitable diagrams.
20 .List any four resemblances and four differences between basidiomycetes and ascomycetes
21. Write an account on asexual reproduction in Algae
22. Give an account of habit, structure and method of reproduction of *Nostoc.*
23. With the help of diagram describe the internal features of *Peziza* apothecium.
24. With labelled diagrams compare the structure of TMV and Bacteriophages.

25. Write about the economic importance of Virus.
26. Explain the general characteristics of Cyanobacteria.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. On Puccinia graminis tritici both heterothallic and heteroecious conditions occur. Illustrate your answer with suitable sketches
28. Describe the structure and reproduction of Polysiphonia with the help of suitable diagrams. Add a note on its life cycle.
29. Draw and label the ultrastructure of a bacterial cell. Describe the different methods of reproduction and genetic recombination in bacteria. Mention anyone medicinal, agricultural, industrial and harmful effect of bacteria.

B.Sc. Plant Science/Botany

CORE – 9

DIVERSITY OF LIFE-2: BRYOLOGY, PTERIDOLOGY AND GYMNOSPERMS

Course Code: 5B09PLS/BOT
No. of credits- 3
No. of contact hours- 54+36

Objectives .

- To get a comparative knowledge of plants- and their life cycle.
- To understand the interrelationships between plants.
- To make the students aware of the morphological, anatomical and reproductive features of primitive and advanced plants and their evolutionary link.
- To enable the student to appreciate their ecological importance and the need of conserving them.
- To develop curiosity in observing and identifying different groups of plants

Course Outline
(Questions for theory examination will cover the Types mentioned for practicals also.)

Module I- Bryology- (16 hrs.+ **12** hrs**)**

Bryophytes-introduction - Salient features and classification-study of the habitat, distribution, habit, thallus organization, internal anatomy, vegetative, asexual and sexual reproduction, sporophyte, life cycle and distinctive features of the following classes (Developmental details not required)**–** hepaticopsida, anthocerotopsida, bryopsida - origin and evolution of bryophytes- relationships with algae and pteridophytes- brief account of the development of bryology in India- economic and ecological importance of bryophytes.

Practical- 12 hrs

1**.***Riccia*- habit-internal structure of thallus-V. S. of thallus through archegonia, antheridia and sporophyte

2.Marchantia-.habit, thallus v.s, thallus with archegonial receptacle, antheridial receptacle, male receptacle V.S, female receptacle V.S, T.S of thallus through gemmae cup, V.S of sporophyte..

3.Anthoceros- habit-internal structure of thallus-V. S. of thallus through archegonia, antheridia, sporophyte V.S.

4.Funaria- habit, V.S.of archegonial cluster, V.S.of antheridial cluster, sporophyte V.S..

Module 2- Pteridology (21 Hrs+ **12**Hrs)

Pteridophytes- Introduction - Salient features and Classification (Reimer's)- Study of the habitat, distribution, habit, anatomy, reproduction and life cycle of the following classes **(**Developmental details are not required) **–** Psilotopsida, Lycopsida, Sphenopsida, Pteropsida (Filicopsida)- origin and evolution of pteridophytes- relationships of pteridophytes with bryophytes and gymnosperms- brief account of the development of pteridology in India-stelar

evolution in pteridophytes- heterospory and seed habit- ecology and economic importance of pteridophytes.

Practicals- **(12 Hrs)**

1. *Psilotum* : external features, stem T.S., synangium T.S
2. *Selaginella:* habit , rhizophore T.S, stem T.S ,axis with strobilus, Megasporophyll and Microsporophyll
3. *Equisetum* – Habit, rhizome T.S, stem T.S., strobilus V.S.
4 *Pteris*- Habit, petiole T.S., sporophyll T.S., prothallus
5. *Marsilea*- Habit, rhizome and petiole T.S, Sporocarp T.S, V.S & R.L.S.

Module 3- Gymnosperms (**17** Hrs + **12** Hrs)

Introduction - Salient features and Classification (Sporne's) - study of the habitat, distribution, habit, anatomy, reproduction and life cycle of the following classes (Developmental details not required)- Cycadopsida, Coniferopsida, Gnetopsida- Origin and evolution of gymnosperms- Economic importance- Relationship with pteridophytes and angiosperms- Indian contribution on Gymnosperms.

Practical - **12** Hours

1. *Cycas*- seedling, coralloid root-entire and T.S., leaflet T.S, petiole T.S., male cone L.S., microsporophyll, micro sporophyll T.S., megasporophyll, ovule entire and L.S.
2. *Pinus* – Branch of indefinite growth, spur shoot, T.S of old stem, needle T.S., male cone, male cone V.S., female cone, female cone V.S.
3. *Gnetum*- Habit, stem T.S(young and mature), leaf T.S, male strobilus, female strobilus, V.S of male cone, V.S. of female cone, V.S of ovule, seed entire.

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Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION
Theory -Plant Science/Botany **Model Question Paper**

CORE COURSE- 9
5B09PLS/BOT - **DIVERSITY OF LIFE-2 BRYOLOGY,PTERIDOLOGY AND GYMNOSPERMS**

Time: 3 Hours **Total Weightage: 30**

Draw diagrams wherever necessary

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer
   i) Intercalary meristem occurs in
      a) Marsilea b) *Equisetum* c) *Selaginella* d) *Lycopodium*
   ii) Winged pollen grains are seen in
      a) *Pinus* b) *Cycas* c) *Gnetum* d) *Ephedra*
   iii) The cap-like structure covering the capsule of Moss
      a) stomium b) annulus c) operculum d) peristome
   iv) Pseudoperianth is seen in
      a) Riccia b) Marchantia c) Funaria d) Anthoceros
2. State true or false
   i) *Adiantum* is commonly known as maiden hair fern.
   ii) Canada balsam, used as a mounting material comes from *Pinus*
   iii) Riccia sporophyte has foot and capsule.
   iv) In Gnetum the xylem shows typical characteristics of Gymnosperms..
3. Fill in the blanks
   i) A siphonostele which is divided into several meristele is described as----------
   ii) Antheridial clusters in moss are commonly known as--------.
   iii) The loose textured wood of *Cycas* is described as ----------.
   iv) bundle in which xylem surrounds phloem is described as--------.
4. Match the following

A	B
i) Trabeculae	*Pinus*
ii) Bars of sanio	*Marchantia*
iii) elaters	*Marsilea*
iv) Sporocarp	*Selaginella*

5. Answer in one word or in one sentence
   i) Gemmae
   ii) yellow clouds
   iii) Ligule
   iv) Where do you notice columella?

Section B

Answer any 4 of the following: (Each question carries a weightage of 1)

6. What is meant by a eusporangiate sporangium development?
7. Explain the dehiscence of sporangium in *Adiantum.*.
8. What evidence can you cite to indicate that Cycas is a living fossil?
9. Mention the special features of Riccia antherozoids.
10. Name two species of *Rhynia.*
11. Write any two distinguishing features of Anthocerotopsida.

Section C

(Short answer questions.Answer any *five;* each question carries a weightage of 1)
Differentiate the following

12. Endodermis in the stem of Selaginella and that of Equisetum.
13. Archegonium of Hepaticopsida and Anthocerotopsida.
14. Compression and petrifaction.
15. Vallecular canal and carinal canal.
16. Sporophyte of Riccia and Funaria.
17. Pteridophytes and gymnosperms.
18. Coralloid root and Rhizophore .

Section D

Short answer questions. Answer any *six; e*ach question carries a weightage of 2.

19. Give an account of the vegetative reproduction in Bryophytes.
20. Economic importance of Bryophytes.
21. Mention the xerophytic characters of Pinus needle with the help of a diagram.
22. Give an account of Microsporophyll of *Cycas,* with the help of a diagram.
23. Explain the structure of the gametophyte of *Psilotum* with the help of a labeled diagram.
24. Give a brief description of the micro and mega gametophytes of *Selaginella.*
25. Write a short note on *Lyginopteris*.
26. Contribution of Birbal Sahni in the field of Palaeobotany.

Section E

(Essay type question. Answer any one; each question carries a weightage of 4)

27. Bottles containing stems of Lycopodium, Selaginella and Equisetum have mixed up due to the negligence of the laboratory assistant. How will you help him so as to give a correct labeling?
28. Write down the Economic importance of Gymnosperms
29. Justify the statement that in Anthoceros there is remarkable association of a simplest gametophyte with a highly evolved sporophyte.

B.Sc. Plant Science/Botany
CORE-10

CORE PRACTICAL-I -METHODOLOGY, INTERMEDIARY METABOLISM, BIOMOLECULES, CELL BIOLOGY, PALEONTOLOGY, GENETICS AND BIOINFORMATICS.

Code : 5B10PLS/BOT
Credit: 3
Contact Hours : 216 Hrs(semesters1,2,3,4& 5)

Aim & Objectives

1.To train the students in the use and maintenance of scientific equipment in biology.

2. To develop in them the scientific way of doing and making them understand that there are many models of experimentation that are possible.

Eligibility to appear for Practical exam of 5B10PLS/BOT

1. Certified Practical Record
2. Collection and submission of TEN lower groups of plants with a brief report.
3. Visit Report

Course outline

Methodology of Sciences -Practicals 36 Hrs

1. Work out problems on measures of central tendencies, measures of dispersion.
2. Measurement of specimens using micrometer.
3. Photomicrography and camera lucida drawings.
4. Familiarizing with different biological instruments.
5. Collection, identification and submission of plants by using different preservation methods.

Methodology of Botany-Practicals 36 Hrs

1. General awareness of Micro technique - maceration, smears & squash
2. Demonstration of microtome sectioning and hand sectioning
3. Separation of plant pigments by paper chromatography.
4. Demonstration of Emasculation and Hybridization, budding, grafting and layering.
5. Study of pollen morphology of the following plants –*Hibiscus, Vinca, Balsm, Ixora, Crotalaria, Bougainvillea.*
6. Acetolysis of pollen grains
7. Preparation of buffer.
8. Measurement of pH.
9. Construct the absorption spectrum of any sample.
10. Visit to Laboratories**.**

Informatics Practicals - **36** Hours

1. Create, Copy and Save a document with Header, Footer, Page No., Date & Time using any software.
2. Insert a table in the above document.
3. Prepare the mark list of students using any applicable software.
4. Create five slides using any applicable software, with different design templates.
5. Students are expected to work with at least any one of the commercial/ scientific packages, to explore the WEB and able to find, recognize, download, install and use software in various areas useful to the research of Biology.

Energy and Intermediary Metabolism- Practical **18Hrs**

1. Extraction of invertase (from any source)
2. Assay of invertase
3. pH dependent activity profile of enzymes
4. Calorimetric estimation of reducing sugars in germinating seeds
5. Demonstration of Hill reaction
6. Separation of leaf pigments by paper chromatography/Column chromatography/ TLC
7. Effect of light intensity on photosynthesis by Wilmot's bubbler
8. Kuhnes fermentation experiment
9. Respirometer experiment
10. Experiment to show anaerobic respiration

Biomolecules and Cell Biology Practicals **36Hrs**

1. To prepare molar, molal, normal and percent solutions.
2. Qualitative test for carbohydrate, aminoacid and protein
3. Quantitative test for sugar in a given solution
4. Quantitative test for sugar in biological samples
5. Estimation of protein and DNA
6. Chromatographic methods for the separation of macro and micro molecules
7. Make acetocarmine squash preparation of onion root tips and to identify different stages of mitosis

Genetics -Practicals **36 hrs**

Meiosis- To make smear preparations of the flower buds of any one of the following Plants- Rhoeo, Tradescantia, Capscicum, Coix

Genetics problems

1. Dihybrid inheritance
2. Allelic and Non allelic Gene interactions.
3. Chromosome mapping (two-point and three point crosses),
4. Chi square analysis
5. Probability factor in Genetics

Paleontology Practical- **18hrs**

1.Fossil pteridophytes- Rhynia Stem, Lepidodendron, Lepidocarpon.
2. Fossil Gymnosperm- Lyginopteris

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KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany**- B.Sc. Practical- Model Question Paper**

(Core Practical-I)

5B10PLS/BOT **- METHODOLOGY, ENERGY AND INTERMEDIARY METABOLISM, BIOMOLECULES, CELL BIOLOGY, PALEONTOLOGY, GENETICS AND BIOINFORMATICS.**

Time: 3 Hours **Max. Weightage= 30**

1. Prepare a standard graph and estimate colorimetrically the quantity of protein/total sugar reducing sugar from the given sample **i**) and write down the principle and procedure **(Estimation- 3; Principle- 0.5; Procedure- 0.5)** **(Weightage-4)**

2. Determine the presence of Protein/reducing sugar/amino acid/sucrose/starch/-- in the given sample **ii**) by conducting appropriate test. Write down the principle and procedure **(Procedure-1; Skill- 1; General test-1; Confirmatory test-1** **(Weightage -4)**

3. Adjust the pH of the given buffer to --- by pH meter /Measure the pH of the given sample **iii)** and write down the procedure **(Skill- 1.5; Procedure-0.5)** **(Weightage-2)**

4. Separate the given sample **iv)** chromatographically **(Weightage-2)**

5. Prepare an acetocarmine squash of **v**) and identify two clear stages of mitotic division with reasons, draw a labeled diagram of each stage and report for valuation.
(**Preparation -1; stages-1; labeled diagrams -1; reasons-1)** **(Weightage- 4)**

6. Measure the size of the given specimen **vi)** using micrometer.
(Skill-1; Calculation-1) **(Weightage- 2)**

7. Spot at sight **vii), viii), ix) and x)** **(Weightage 1x4= 4)**

8. Work out the problems **xi)** and **xii)** **(Weightage-4+2)**

9. Set upan experiment **xiii)** in relation to Photosynthesis or Respiration **(Weightage- 2)**

KEY TO THE SPECIMENS

i) Carbohydrate\ Protein; BSA

ii) Reducing or non reducing sugar\ starch\ protein

iii) Any buffer solution

iv) Plant pigment

v) Onion root tip

vi) Algal filament\ pollen grain\ xylem element

vii) Fossil type mentioned in the syllabus

viii) Pollen of any plant mentioned in the syllabus

ix) Any part of compound microscope\ microtome

x) Bioinformatics

xi) Dihybrid/ allelic interaction/Three point /two point test cross

xii) Chi-square analysis/ non allelic interaction

xiii) Intermediary Metabolism

Scheme of questions

Quest.No.	Subject	Weightage
1	Intermediary Metabolism	4
2	Biomolecules	4
3	Methodology	2
4	Methodology	2
5	Cell Biology	4
6	Methodology	2
7	Paleobotany, Methodology, Bioinformatics	1+1+1+1
8	Genetics	4+2
9	Intermediary Metabolism	2
	Total	30

B.Sc. Plant Science/Botany

CORE – 11

DIVERSITY OF LIFE-3- ANGIOSPERM SYSTEMATICS AND MORPHOLOGY

Course Code: 6B11 PLS/ BOT
No. of credits- 2
No. of contact hours- 36+ 54

Aim of the Course

To enable the proper description, identification, naming and classification of higher plants- angiosperms- to conserve.

Objectives:

1.To observe the variations among plants, especially angiosperms.
2.To understand the way of description of a plant.
3. To study the floral characters with an aim to identify the taxa authentically.
4. To prepare taxonomic keys with the help of morphological and floral characters.and to classify plants based on similar/dissimilar characters
5. To study the various types of floral distribution in Northern Kerala
6. To apply taxonomic data into various other fields.
7. This study enriches the systematic Botany which can be utilized for botanical diagnosis of fragmentary crude drugs.
8. This study will be useful in identifying medicinal taxa.
9. This study also helps in knowing the preliminary phytochemistry of plant organs

Course Outline

(Questions for theory examination will cover the Types/families for practicals also.)

Angiosperm systematics (28 hrs+ 48 hrs)

Module-1- Systematics : 8 hrs

Objectives and relevance, History of Taxonomy in India

Systems of classification-Artificial, Natural and Phylogenetic; Brief account of Linnaeus', Engler & Prantl's, Hutchinson's and APG-II (2003) classification.

A detailed study of Bentham& Hooker's system-merits and demerits.

Module- 2 : Plant nomenclature: **6 hrs**

Principles and rules of Botanical Nomenclature, ICBN, Latest code –brief account, Rank of taxa, Type concept, Rule of priority, Author citation. Plant identification: Taxonomic literatures- Floras, Manuals, Monographs and Revisions, Construction and use of Keys. Important Herbaria, Botanical gardens.

Module- 3 - Recent trends in Taxonomy 4 hrs

Morphology in relation to taxonomy, Anatomy in relation to taxonomy, Embryology in relation to taxonomy, Chemotaxonomy, Cytotaxonomy, Molecular taxonomy and Numerical taxonomy - brief account only.

Module- 4 - Diagnostic features 10 hrs

Study of the diagnostic features of the following orders and series of Bentham and Hookers system and the families mentioned for practicals with a brief account of the economically important plants:

Ranales, Parietales, Malvales, Geraniales, Sapindales, Rosales, Myrtales, Passiflorales, Umbellales, Rubiales, Asterales, Gentianales, Polemoniales, Personales, Lamiales, Curvembryeae, Unisexuales, Microspermae, Epigynae, Coronarieae, Calycineae, Glumaceae

Practical - 48 Hours

1.Study of taxonomic features and economic importance of representative members* of the following families.

Annonaceae, Nymphaeaceae, Capparidaceae, Malvaceae, Rutaceae, Anacardiaceae, Papilionaceae, Mimosaceae, Caesalpiniaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Scrophulariaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Zingiberaceae, Liliaceae, Arecaceae, Poaceae.

2. Construction of dichotomous keys for the easy identification of members of the family Papilionaceae, Rubiaceae and Euphorbiaceae.- demonstration only.

3. A minimum of 30 herbarium specimens representing all the prescribed families with field notes on at least 50 plants collected including any common local plants.

4. Identification of herbarium specimens and local plants.

5. Field trip to learn the plant diversity and characteristics of plant families under the supervision of teachers for at least 7 days.

*Representative members- *Annona, Mangifera, Anacardium, Eucalyptus, Mimosa pudica, Saraca indica, Coccinia indica, Ferula asafoetida, Ixora, Cinchona, Eclipta alba,Vernonia, Gymnema, solanum torvum, Scoparia dulcis, Coleus aromaticus, Amaranthus viridis, Ricinus communis, Allium cepa, Allium sativum, Cocos, Oryza.*

Module- 5 - Angiosperm Morphology (Theory 8 hrs, Practical 6 hrs)

Vegetative and floral morphological features

Leaf morphology (terminology)- Arrangement-phyllotaxy, ptyxis and vernation; Leaf texture-chartaceous, coriaceous, glabrous, glaucous, pubescent; Domatia and glands; Leaf shape-ovate, obovate, elliptic, oblong; Leaf margins-unlobed, lobed, plane, revolute; Leaf apex – acute, obtuse, emarginate, truncate; Leaf base- acute, obtuse, truncate, cordate, sagittate; Venation-organization of major veins-pinnate, palmate, parallel.

Inflorescence : Racemose,Cymose and Mixed types with examples Flower as a modified shoot, Floral parts, arrangement, relative position ,numeric plan ,cohesion and adhesion of stamens, symmetry of flower, aestivation types, placentation types, floral diagram and floral formula.

Fruits: Simple, Aggregate and Multiple-different types.

Practical **6 Hours**

1. Leaf submission as an album to study the diversity in leaf shape, tip, base, margin and venation
2. Identify with a note the different types of inflorescence, fruits and placentations.
3. Submission of preserved materials of various inflorescences of racemose, cymose and mixed/special types.

References:

1. Datta S C, *Systematic Botany*, 4th Ed, Wiley Estern Ltd., New Delhi, 1988.
2. Eames A. J. - *Morphology of Angiosperms* - Mc Graw Hill, New York.
3. Heywood - *Plant taxonomy* - Edward Arnold London.
4. Jeffrey C .J. and A. Churchil - *An introduction to taxonomy* – London.
5. Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F., Donogue, M.J., 2002. *Plant Systematics: A Phylogenetic approach,* 2nd edition. Sinauer Associates, Inc., USA.
6. Lawrence - *Taxonomy of Vascular Plants* - Oxford & I B H, New Delhi.
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8. Pandey, S. N, and S.P. Misra (2008)-*Taxonomy of Angiosperms*- Ane Books India, New Delhi.
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11. Singh V. & Jain - *Taxonomy of Angiosperms* - Rastrogi Pubs, Meerut.
12. Singh G.1999. *Plant systematics: Theory and Practice*. Oxford and IBH, Pvt.Ltd.New Delhi.
13. Sivarajan V. V - *Introduction to Principles of taxonomy* - Oxford &I B H New Delhi.
14. Takhatajan - *Flowering Plants* - Edinburg, Oliver & Boyd.
15. Vashishta P. C - *Taxonomy of Angiosperms* - Chand & Co, Meerut.
16. Vasudevan Nair, R - *Taxonomy of Angiosperms* - APH Pub: New Delhi
17. Venkateswaralu, V. - *Morphology of Angiosperms* - Chand & Co.

Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Theory -Plant Science/Botany **Model Question Paper**

CORE – 11

6B11PLS / BOT - **DIVERSITY OF LIFE-3 -ANGIOSPERM SYSTEMATICS AND MORPHOLOGY**

Time: 3 Hours **Total Weightage: 30**

Draw diagrams wherever necessary

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) Tautonyms are
- a)Different names used for same taxon
- b) Names with specific epithet exactly repeats the generic name
- c) Names which have older valid names
- d) Identical names given to different taxa

ii) Glabrous surface of lamina is
- a) Smooth without any hair
- b) Shining and covered with waxy coating
- c) Rough with short rigid points
- d) Covered with hairs

iii) Statistical methods used in taxonomy
- a)Numerical
- b) Adansonian
- c) Phenetic
- d) All of the above

iv) A monocarpic palm is
- a) Areca
- b) Borassus
- c) Elaeis
- d) Corypha

2. State true or false

i) A monograph is an inventory of plants of limited geographical area .
ii) Rotate corolla is gamopetalous with limb at right angles to the short tube
iii) Fruit of Datura is a septicidal capsule
iv) S type Sieve tube plastid used in delimitation of taxa accumulates protein

3. Fill in the blanks

i) The taxon with single morphological pollen type is called ……
ii) Anthoxanthin and anthocyanin belong to the group of naturally occuring phenols called …….
iii) Branched stamens are seen in ……
iv) Drug obtained from dried roots of Rauvolfia serpentina is …..

4. Rearrange column B and C to match column A

	A	B	C
i	Monocarpellary superior ovary	Axile	Hesperidium
ii	Polycarpellary superior apocarpous	Apparently Basal	Legume
iii	Polycarpellary superior syncarpous	Parietal	Etaerio of berries
iv	Tricarpellary inferior syncarpous	Marginal	Pepo

5. Answer in one word or in one sentence

i) Botanical name of Star anise
ii) Specimen used by the author as nomenclatural type
iii)The internode between corolla and androecium .
iv) Botanical gardens where only woody species are grown.

Section B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6.Manual and Flora
7. Phenetics and Cladistics
8. Binary characters and multistate characters
9. Apocynaceae and Asclepiadaceae.
10. Holotype and Lectotype
11 Coronarieae and Calycineae

Section C

Answer any *Five*

(Short answer questions*;* each question carries a weightage of 1)

12 Enumerate embryological features of Orchidales helpful in taxonomic delimitation of the order.
13. Describe the inflorescence of Moraceae.
14. Write the binomial of any two gourds.
15 Briefly explain the floral features of Passiflorales
16. What is Placentation? Mention the different types.
17Explain the different types of gynoecium in Nymphaeaceae.
18. Bring out the role of terpenoids in the diversification of family Asteraceae.

Section D

Short essay questions. Answer any five*;* each question carries a weightage of 2.

19. Write the botanical name, family, morphology of the useful parts and uses of any three pulses.
20 Explain the different types of Androecium seen in members of Cucurbitaceae
21 What is Rule of Priority? Comment on its applications.
22 What are the different cytological characters useful in taxonomy? Explain their role in solving taxonomic problems.
23 With suitable diagrams describe the mixed type of inflorescence.

24 Briefly explain the methods involved in the preparation of herbarium specimens. Add a note on the significance.
25 With the help of diagram explain the spikelet of Poaceae.
26 Enumerate the guidelines for construction of Dichotomous Keys.

Section E

Essay type question. Answer any one; each question carries a weightage of 4

27. Give the outline of the system of classification proposed by Bentham and Hooker In what respect it is different from that of Hutchinson.

28 Discuss how numerical taxonomy could be used as an effective tool in plant classification.

29 Describe the characters of Ranales Add a note on its primitive features.

B.Sc. Plant Science/ Botany

CORE – 12

PLANT FORM AND FUNCTION-1- ANGIOSPERM ANATOMY AND REPRODUCTIVE BOTANY

Course Code: **6B12 PLS/** BOT
No. of credits- 3
No. of contact hours- 54 + 36

Aim of the Course

The internal structure of plants and the reproduction gives an idea of major elements of variation.

Objectives:

1. To observe and differentiate the variations existing in the internal structure of plants.
2. To create interest in plant anatomy and to appreciate the function of a particular tissue or organ correlated with its structure.
3. To enable the student understand the anatomical features with in the system instead of merely memorizing the technical terms and the text book figures.
4. To identify different plants with respect to its anatomical features though they are not studied as part of the syllabus.
5. To enable a comparison existing among different parts in different plants. And enable the student in identifying different plants by anatomical peculiarities.
6. To know the development and to understand the life cycle of angiosperms and variations existing among them from flower to seed.

Angiosperm Anatomy: - **40 hours**

Module 1- Cell inclusions -3 hrs

Introduction, Objective and scope of Plant Anatomy – general structure of higher plants-cell wall- chemical nature of cell wall – microscopic and submicroscopic structures of cell wall – formation of walls – growth of walls

Module 2 Tissues - 17 Hrs

The tissues—meristems-classification-characteristics -meristems and growth of the plant body-root apex-dicot, monocot- vegetative shoot apex-theories- floral apex-. Mature tissues – Définitions, Classification – simple, complex and spécial tissues – secretory cells.

Module 3 Structure of plant body -20 hours

Primary vegetative body of the plant-stem – ontogenic development –arrangement of primary tissues in the root, stem and leaves (Dicots and Monocots)-Secondary structure –general development-structure of vascular cambium-unusual secondary growth-Bignonia, Boerhaavia, Dracaena.-.- Nodal anatomy, Floral anatomy, Abscission of leaf – Brief account- wood

identification -Wood anatomy in relation to phylogeny – Brief account -Ecological anatomy – Hydrophytes, Xerophytes and Halophyte.

Practicals: - (26 hours)

1. Non living inclusions – Cystolith, Raphides, Aleurone grains.
2. Starch grains – Eccentric, concentric, compound
3. Apical meristem – Root apex and stem apex.
4. Simple permanent tissues – Parenchyma, Chlorenchyma, Aerenchyma, Collenchyma and Sclerenchyma.
5. Primary structure – Dicot stem – Hydrocotyle, Cephalandra, Eupatorium or any dicot stem.
6. Monocot stem – Bamboo, Grass, Asparagus or any monocot stem.
7. Dicot root – Tinospora, Ficus, Pea
8. Monocot root – *Colocasia, Hedychium, Pandanus* or any monocot root.
9. Secondary structure – Stem (Normal type) – *Tinospora, Thithonia, Vernonia* or any other normal type.
10. Secondary structure – Root (Normal type) – *Tinospora, Ficus, Carica papaya*, *Ricinus* or any other normal type.
11. Secretory tissues – Resin canal, Nectory, Latex vessel, Lysegenous and schizogenous cavities, Laticifers – articulated and non-articulated latex vessels.
12. Epidermal structures – Trichomes, Hairs, Glands, Stomata.
13. Anomalous secondary thickening – *Bignonia, Dracaena, Boerhaavia*.
14. Leaf Anatomy – Dicot leaf: *Ixora*; Monocot leaf: Grass

Reproductive Botany Theory–14 Hrs

Module 4 - Reproductive Botany -

Introduction and Historical account of Embryology. Structure and functions of Microsporangium and wall layers.Microsporogenesis and development of male gametophyte Megasporogenesis and development of female gametophyte (Polygonum, Allium and Peperomia); -Types of ovules-Fertilization., Endosperm – structure, development and types (Nuclear, Cellular, Helobial, Special type – Ruminate) -Embryo – Structure and development of Dicot embryo (Capsella type), Monocot embryo (Najas). Polyembryony – Classification and Significance-Apomixis-vegetative reproduction - Agamospermy- apospory and parthenocarpy.

Palynology - Pollen structure and Morphology, Economic importance, Pollen allergy-

Practicals 10 hrs

1.Identify C.S of Anther; Dicot embryo, Monocot embryo and eight nucleated embryo sac.

2. Study of the different stages of anther development.

3.Pollen germination test.

4.To dissect and display early stages of embryo development- *Tridax/ Crotalaria.*

References:

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2. Coutler E. G. (1969) *Plant Anatomy – Part I Cells and Tissues* – Edward Arnold, London.
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Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION
Theory -Plant Science/Botany **Model Question Paper**

CORE COURSE-12
6B12 PLS/ BOT - **PLANT FORM AND FUNCTION-1- ANGIOSPERM ANATOMY AND REPRODUCTIVE BOTANY**

Time: 3 Hours **Total Weightage: 30**

Draw diagrams wherever necessary

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) Most common type of ovule is
a) Anatropous b) Orthotropous c) Amphitropous d) Circinotropus

ii) Xylem and phloem occurs side by side
a) Concentric b) Collateral c) Radial d) Bicolateral

iii) Digestive glands are present in
a) Papaya b) Ocimum c) Nepenthes d) Euphorbia

iv) Among these, which is a nitrogenous waste product?
a) Gum b) Caffeine c) Tannin d) Resin

2. State true or false

i) Exine of the pollengrain is mainly sporopollennin
ii) The ovule has a stalk called funicle
iii) Amphicribral vascular bundles are found in Dracaena.
iv) Ray initials produce medullary rays.

3. Fill in the blanks

i) The main body of the ovule enclosed in …….
ii) The leaves in the gymnosperm contain a peculiar conducting tissue called……
iii) Helobial endosperm present in……..
iv) Star-shaped sclereids are ……..

4. Match the following

A	B	C
i) Hay fever	Sieve tube	Glandular tissue
ii) Perforation plate	Allergy	Endosperm
iii) Acetyl choline	Embryosac	Phloem
iv) Secondary nucleus	Stinging hair	Pollen

5. Answer in one word or in one sentence
i) porogamy
ii) quiescent Centre
iii) Liquid endosperm
iv) Tyloses

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Microspore and Megaspore
7. monospric and tetrasporic embryosac
8. Lysigenous glands and Schizogenous Glands
9. Exalbuminous Seeds and Albuminous Seeds.
10. Storied Cambium and Non-storied Cambium.
11. Crystalloids and Globoids.

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. Enumerate the functions of Tapetum.
13. Discuss about the applications of parthenocarpy in Agriculture.
14. With suitable examples, describe the reserve food materials seen in plants.
15. What is Dendrochronology?
16. Explain the structure of isobilateral leaf.
17. Write brief note on reserve food of plant cell.
18. Write about the primary structure of dicot root.

Section D

Answer any ***Six***

(Short-essay questions; Each question carries a weightage of 2)

19. Describe the structure of Polygonum type of embryosac.
20. Give an account of latex vessel.
21. Explain the significance of apomixes.
22. Draw a labeled sketch of of T.S. of young anther.
23. Give an illustrated account on the different types of vascular bundles met within dicotstems. Mention examples.
24. Describe the cell wall organization and types of pits.
25. Write briefly about periderm formation in dicot stem.
26. with a neat labeled diagram describe the structure of the organ which give out liquid water.

Section E

Answer any **One**

(Essay- type questions; Each question carries a weightage of 4)

27. With the help of diagram explain megasporogenesis.
28. Describe the various theories related to meristem.
29. What is anomalous secondary thickening? Explain the type of secondary thickening in Boerhaavia stem.

B.Sc. Plant Science / Botany

CORE – 13PLANT FORM AND FUNCTION-2- PLANT PHYSIOLOGY

Course Code: 6B13 PLS/ BOT
No. of credits- 2
No. of contact hours-36 +18
Aim of the Course

To understand the functioning of plant molecules, plant cells and plant body

Objectives

- To understand the physical principles which is needed to explain the mechanism of plant living and growth
- To enable the students in understanding the function of plants with respect to its environment and structure.
- To develop appreciation in the wonderful mechanism of transport system exist in plants.
- To create research interest and observation skill by introducing the way by which plant physiology researches were carried out.

Course Outline

Module-1 (12 Hrs)

Introduction-The science of plant physiology-Retrospective-Practical applications

Water as a plant constituent-Function of water in plants-The water molecule-diffusion and osmosis-osmotic pressure- DDP-water potential-The components of water potential.

The plant in relation to water-Water loss by transpiration-Mechanism of stomatal guard cell movement-K+ion transport-Antitranspirants-Mechanism of water absorption and transport-The cohesion- transpiration pull theory-Merits and Demerits-Testing with xylem anatomy-Water stress and its physiological consequences-Drought tolerance-salinity stress-Pathway of discovery; Studying water, minerals and roots: Paul .J. Kramer.

Module-2 (12Hrs)

Mineral nutrition- The elements in plant dry matter-Methods of studying plant nutrition-solution culture-The essential elements-criteria of essentiality-functions-nutrient deficiency-symptoms and functions of elements-a brief review.

Absorption of mineral elements- Roots as absorbing surfaces-passive and active absorption-simple and facilitated diffusion. How carriers and channeles speed passive transport-Donnan equilibrium -Active uptake –carrier concept

Transport in the phloem-source –sink relationship and translocation in sieve tubes-- testing with phloem anatomy- Evidences of phloem transport.-experiments- phloem loading and unloading- Mechanism of sieve tube translocation-Pressure flow hypothesis-Photosynthesis and sink demand-Hormone directed transport-Turgor sensing in sugar transport-The control of fruit and vegetable composition.- Assimilate partitioning and control mechanism- Pathway of discovery-Discovery of the empty ovule technique by John- H- Thorne(Ref;salisburry and Rose 4e)

Module-3 (12 Hrs)

Plant Growth and development - Growth and Development-What is meant by Growth?-Patterns of growth and development-some features of plant growth. Steps in cell growth and development-Growth kinetics-Growth through time-S-shaped Growth curve.-Growth-Vegetative growth-Reproductive growth-Principal events of reproductive growth-The flowering stimulus-Florigen concept-Ageing-Senescence and death. –

Hormone and Growth regulation-Concept of hormone and their action-Auxin, Gibberellin,Cytokinin,ABA,and Ethylene-physiological role, A brief outline of the chemistry and biosynthesis.

The power of movement in plants- Nastic movement-Nyctinastic and seismonastic movement, Tropism –Directional Differential growth- phototropism and Gravitropism

Pathway of discovery -Studying the gravitropic response of cereal grasses-Peter.B-Kaufman-case study (Ref;Salisbury4e)

Photomorphogenesis- Pathway of discovery Discovery of phytochrome – Stereling–B Hendriction-Physiological effects of phytochrome- Photoperiodism Flowering Role of light in seed germination-Physiology of seeds-Seed germination- Morphology and biochemical changes accompanying seed germination.

Practicals (18Hrs)

Plant Physiology Practicals (18Hrs)

1. Determination of water potential by tissue weight change method
2. Water potential of onion peel/Rheo peel by plasmolytic method
3. Effect of temperature on permeability
4. Papaya petiole osmoscope/simple osmoscope/potato tuber osmoscope
5. Determination of stomatal index
6. Comparison of rate of transpiration by the upper and lower surface of the leaf by cobalt chloride method
7. Relationship between water absorption and transpiration
8. Determination of the rate of transpiration using Ganongs potometer
9. Effect of scarification on seed germination
10. Photomorphogenesis in seedlings grown under normal light and darkness
11. Testing of seed viability by tri phenyl tetrazolium chloride.
12. Determination of gravitropism using clinostat

References:

1. Devlin & Witham – Plant Physiology (C B S publishers).
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6. Kumar & Purohit – Plant Physiology - Fundamentals and Applications (Agrobotanical publishers)
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8. Noggle G R & Fritz G J (1991) Introductory Plant physiology (Prentice Hall of India).
9. Pandey S.N. & Sinha B. K. (1986) – Plant physiology (Vikas publishing House- New Delhi).
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12. Sundara Rajan S . – College Botany Vol.IV (Himalaya publishing House).
13. Verma, V. (2007)- Text Book of Plant Physiology, Ane Books Pvt. Ltd., .New Delhi.
14. William G. Hopkins – Introduction to Plant Physiology (John Wiley & Sons, New York).

Code: Reg. No:

Name:

KANNUR UNIVERSITY

B.Sc Pant Science / Botany **- Theory Model Question Paper**

CORE-13

6B13PLS /BOT **- PLANT FORM AND FUNCTION-2- PLANT PHYSIOLOGY**

Time: 3 Hours **Total Weightage: 30**

Section A

(Objective questions (Multiple choice /one word/sentence/ fill in the blanks /Match the following, true or false etc.) in cluster of four. Each cluster carries a weightage of 1

1.Choose the correct answer

i) Which of the following GA is immediate precursor of all other GA's in plants
a) GA_1 b) GA_2 c)GA_{10} d)GA_{12}

ii) Which of the following elements is essential for the synthesis of chlorophyll?
a) Calcium
b) Potassium
c) Manganese
d)Manganese

iii) A plant, by opening and closing its stomata, must achieve a balance between
a) Oxygen loss and water uptake
b) Carbon dioxide loss and sugar uptake
c) Water loss and carbon dioxide uptake
d) Sugar loss and oxygen uptake

iv) Which of the following is not a specific physiological effect of gibberellin?
a) Elongation of internodes
b) Bolting and flowering
c) Synthesis of alpha amylase
d) Ripening of fruit

2. i) Differential distribution of photo assimilates in different sinks of the plant is called as

(a) Seperation of assimilates
(b) Assimilates partitioning
(c) Storage of photo assimilates
(d) Photo assimilates consumption

ii) If a cell A has an osmotic pressure of 25 atm and T.P of 15 atm. and cell B has O.P of 30 atm and T.P of 10 atm. Then the movement of water will occur from
a) Cell B to cell A
b) Cell A to cell B
c) Both directions
d) No movement of water

iii) Which of the following is not a deficiency symptom of phosphorus?
a) Premature leaf fall
b) Necrotic areas on leaves or fruits

c) Chlorosis of leaves
d) Dark green coloration of leaves

iv) Which of the following is not a specific physiological effect of gibberellin?
a) Elongation of internodes
b) Bolting and flowering
c) Synthesis of alpha amylase
d) Ripening of fruit

3**. State true or false**
i) Seed germination is a phytochrome mediated photoresponse
ii) Xanthium is a longday plant
iii) An essential plant nutrient required for the regulation of stomatal opening and closing is calcium
iv) Vernalization shortens the vegetative period and hastens flowering

4Answer in one word or in one sentence
i)In rainynseason the doors and windows swell up due to-------
ii)Name the aminoacid that act as a precursor for the biosynthesis of IAA

iii)The amount by which the diffusion pressure of the solvent molecules in a solution is lower than that of the pure solvent at identical temperature and atmospheric pressure is called ……..

iv)Name any method to measure the rate of transpiration

5. Rearrange column B and C to match column A

i)	auxin	cell division	F.W.Went 1928
		Arrest of the cell division	
ii)	gibberellin	Increase in mineral uptake	Ohkuma.et.al 1965
		Anti transpirant	
iii)	Abscisic acid	Fruit ripening	Skoog and miller 1955
		Elongationof the internode	
iv)	Cytokinin	Stoppage of guttation	Sumuki and Yabuta1938
		Apical dominance	

Section B

Answer any four of the following. (Each question carries a weightage of 1)

Differentiate any four of the following

6. Active and passive absorption of water
7. D.P.D and water potential
8. Transpiration and guttation.
9. Phototropism and photoperiodism

10. Drought stress and salinity stress.
11. Photo taxis and chemotaxis

-

Section C

(Short answer questions. Answer any *five;* each question carries a weightage of 1)

12. Define the term "growth" as applied to plants. How can plant growth be measured?
13. What is turgor pressure? Can plant cells have negative turgor pressure values? Can you calculate the turgor pressure of a cell from water potential and osmotic potential values?

14. Discuss various types of senescence that can occur during plant development." Is senescence synonomous with "necrosis" (death)? Explain your answer.

15. Write note on critical photoperiod.
16. What are the causes of seed dormancy?
17. Evaluate the practical application of vernalisation in a tropical country like India.
18. The cell sap of the roots of halophytic plants has normally higher osmotic pressure than that of the cell sap of mesophytic plants.why?

Section D

Short answer questions. Answer any *six; e*ach question carries a weightage of 2.

19)Assume that a plant cell with a water potential of -1.0 bar is placed in a beaker containing a sucrose solution that has a water potential of -4.0 bar Further, assume the temperature of the solution is 24 C. Thus:

i)The plant cell will become a). larger b.) smaller c). not change
ii)The weight of the plant cell will :a). increase b). decrease c). not change
iii)The concentration of the sucrose solution in the beaker will: a) increase b). decrease c). not change
iv)The turgidity of the plant cell will a.) increase b). decrease c). not change
v) The osmotic potential of the sucrose solution will become a). more negative b). less negative
vi) There will be a net movement of water from the a). cell to the solution b). solution to the cell
vii) The cell will likely plasmolyse a). False b) True

20. What is a mineral deficiency? How can a mineral deficiency be recognized? How can farmers benefit from nutrient analysis?

21. Discuss the mechanism of absorption of mineral salts by plants. How does it differ from absorption of water?

22 During the course you might have gone through a number of practical techniques used in the study of whole plant physiology. Discuss any one of these techniques.

23 “Explain how light leads to the opening of the stomata on the leaves of higher plants”

24. Describe the theory which you think best explains the mechanism underlying the translocation of organic solute through phloem.

25. How would you proceed to make a waterculture? Explain the effects on plant of the omission of the salts of calcium, phosphorus and magnesium respectively?
26. Write an account on 'The resistance of plants to stress'.

Section E

(**Essay type question. Answer any one; each question carries a weightage of 4)**

27. Discuss the movement of water throughout a higher plant
28. What is a phytohormone? How many kinds of them are known to you? Describe atleast two phytohormones mentioning its structure, function and synthesis.

29 What is an essential element? How many have been identified? What is the difference between an essential element and a beneficial one? Provide examples.Give deficiency symptoms and roles of any three macro elements and one micro element.

	Multiple choice Weightage 1 for four questions A	Fill in the blanks Weightage 1 for four questions A	True/false1 Weightage 1 for four questions A	Match the following 1 Weightage 1 for four questions A	Short answer weightage 1 B	Short answer weightage 1 C	Short essay weightage 2 D	Essay weightage 4 E
Knowledge	6	2	3	4		2	1	1
comprehension		1	1			1	2	1
application	1	1				1	2	
analysis					4	2	3	
synthesis	1							
evaluation						2		

B.Sc. Plant Science/Botany

CORE– 14

BIOTECHNOLOGY, NANOBIOTECHNOLOGY AND PLANT TISSUE CULTURE

Course Code: 6B14PLS/BOT
No. of credits- 3
No. of contact hours- 54+18=72 hrs

Aim and objectieves

1. To know the fundamental techniques of biotechnology and the history of its development.
2. To orient them to apply the technology in agriculture and other fields.
3. To make them aware of the economic, social and environmental problems of gene manipulation
4. To acquaint and train them in the use of the equipments in biotechnology
5. To understand the application of bio technology and nanobiotechnology.

Course Outline

Module-1- Introduction –Emergence of Biotechnology 20Hrs

Recombinant DNA and Molecular cloning- Restriction Endonucleases-Ligases and other DNA modifying Enzymes (cutting, modifying and joining DNAmolecules)

Cloning vectors- Plasmids-Bacteriophages-Hybrid Vectors-Binary and shuttle vectors. PBR322, PUC, λphage. Ti and Ri Plasmids. Consruction of recombinant DNA methods.

Polymerase chain reactor- methodology-essential features-application

Getting DNA into cells-Vector method.Agrobacterium mediated gene transfer-Direct DNA uptake-Electroporation-shot gun method-microinjection -

Strategies of molecular cloning - Screening, selection and analysisof recombinants, Molecular probes-Colony Hybridisation-insitu hybridization-southern.northern western blotting-RFLP- RAPD, -FISH- DNAand RNA Fingerprinting-Genomic Library-cDNA Library and Gene bank- Brief account of: Antisense RNA technology; Gene
Silencing; RNA interference; Microarray and Biosensors

Genomes-Genomes can be mapped both geneticaly and physically-Genome sequencing produces the ultimate physical map-DNA Sequencing method - Mapping and sequencing of human genome.-the human genome project. and plant genome project.

Module-2 Biotechnology- applications 12Hrs

Biotechnology of Nitrogen Fixation Nitrogenases- structure and chemical properties-substrate and hydrogen –deuterium reactions-hydrogenases-hydrogen donating system.Nif Genes-Regulation of nif gene expression.Nod gene Expression-Transfer of nif gene to other organisms.-**Biotechnology of photosynthesis** -Chloroplast genome organization-Gene content and arrangement-regulation of gene expression.Regulation of gene expression in the nuclear coded gene and plastid gene-improvement of photosynthesis

Gene transfer technique for the improvement of agronomic characters

Pest Resistance-Herbicide Resistance-drought resistance-enrichment of storage protein (Mechanism of gene action)-Flower colour, Shape, fruit ripening, colour and flavour-Improvement of the nutritional quality of seeds-post harvest preservation.

Module-3 -Recombinant DNA technology and society 7 hrs

Bioechnology and Bio ethics – an overview of Genetic screening for any predisposition symptoms, Gene therapy-DNA fingerprinting-GMOs, food safety- environmental concerns - Slow ripening fruits- controlled ripening .Cotton without insecticide-Biosafety issues and GMOs-Genetic screening and privacy-Role of multi national companies – Agribusiness-Golden Rice- (withvitamin-c) Terminator Genes. Economic, and Legal issues. Bio Ethics-Patenting Life forms- Biotechnology, Patents and the Third World.Biotechnology and the future of Agriculture-Stem cell research-sociopolitical issues- .HGP and ethical questions.

Module-4

Nano biotechnology 9Hrs

Basics of Nanobiotechnology

Introduction- Background and definition of nanotechnology - nanosystems in nature- nano scaled bio molecules (nucleic acids and proteins) –chemical synthesis of artificial nanostructures.-Technologies for visualization of biological structures at the Nanoscale-Atomic force microscope- magnetic resonance force microscopy-Nanoscale scanning electron microscope- Nanoparticles- - Applications of nanotechnology in life sciences- Nano biotechnology and systems biology- nanobiology and the cell- biosensing of cellular responses.

Module-5

Plant Tissue culture – **6 Hours**

Culture media; composition, preparation and sterilization – Totipotency:definition and importance - Dedifferentiation and redifferentiation - Callus and suspension culture, meristem culture - Somaclonal variation - Somatic embryogenesis , Synthetic seeds -Anther culture and production of haploids - protoplast culture – somatic hybrids –cybrids

Practicals 18 hrs

1. Isolation of DNA from plant tissues.
2. Production of callus
3. Visit to a well equipped biotechnology laboratory.
4. Preparation of plant tissue culture medium.
5. Demonstration of procedure of synthetic seeds

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Code: Reg. No**:**

. Name :

KANNUR UNIVERSITY

B.Sc Plant Science Theory Model Question Paper

CORE– 14

6B14PLS/BOT - **BIOTECHNOLOGY, NANOBIOTECHNOLOGY AND PLANT TISSUE CULTURE**

Time: 3 Hours Total Weightage: 30

Section A

(Objective questions (Multiple choice /one word/sentence/ fill in the blanks /Match the following, true or false etc.) in cluster of four. Each cluster carries a weightage of 1

1. i) M13 is a
   (a) Plasmid vector
   (b) cosmid vector
   (c) viral vector
   (d) Phagemid vector

ii). RFLP analysis is a technique that
   (a). uses hybridization to detect specific DNA restriction fragments in genomic DNA
   (b). is used to determine whether a gene is transcribed in specific cells
   (c). is used to detect genetic variation at the protein level.
   (d). is used to amplify genes for producing useful products

iii) The technique of recombinant DNA was initiated in
   a)1880s b)1930s c)1950s d)1970s

.iv) . What is the function of restriction enzymes?
   a) add new nucleotides to the growing strand of DNA
   b) join nucleotides during replication
   c) cut nucleic acids at specific sites
   d) join nucleotides during transcription

2 i) Plasmid vectors for cloning
   a) can generally accommodate larger inserts than phage vectors can.
   b) grow within bacteria, and are present in bacterial colonies on an agar plate.
   c) include centromeres to allow propagation in yeast.
   d) burst bacteria and form plaques on a “lawn” of bacteria.

ii)‘Golden rice’ is nutritionally superior to normal rice due to
   a)vitamin A
   b)vitamin B
   c)vitaminC
   d)VitaminD

iii) The “sticky ends” generated by restriction enzymes allow:

a) selection for plasmids lacking antibiotic resistance
b) easy identification of plasmids which carry an insert
c) replication of transfer RNA within the bacterial cell
d)pieces of DNA from different sources to hybridize to each other and to be joined together

iv)Arabidopsis is advantageous for plant genetic research because:
a) it is a close relative of corn and results with this species can be applied to problems in corn
b) it is an endangered species
c) it is the closest to humans of any existing plant
d) it is a small plant with a small genome size which can be raised inexpensively

4. State true or false
i) Human Genome Project was very successful in determining the functions of over 80% of the genes located in 46 chromosomes
ii) Ø x174 has a double strandedRNA
iii) Cybrids are synonymous to synthetic seeds
iv) HEPA type of filter is located in Laminar air flow

5. Answer in one word or in one sentence
i) An intercalating dye used to detect nucleic acid when viewed under uv light is--------
ii)The expansion of PUC vector is------
iii)The function of Hup gene in rhizobium is-----
iv)Name a cloning vector that can be used to clone large DNA fragments (> 1 MB)

6. Rearrange column B and C to match column A

i)	PBR322	Phage replacement vector	48.502kbp
		Phage insertion vector	
ii)	λgt10	Green flourescence	6kbp
		Ampicilin resistance	
iii)	pLFR5	Cohen and Boyer	2676bp
		Lac Zgene	
iv)	pUC8	phagemid	4362bp
		cosmid	

Section B

Differentiate the following: (Each question carries a weightage of 1)
6)PBR322 and PUC

7) Nif gene and nod gene

8) Micro injection and short gun

9) cDNA library and DNA library.

10) southern and western blotting

11) Anther culture and protoplast culture

Section C

(Short answer questions. Answer any five; each question carries a weightage of 1)

12) What is the principle of blue-white selection for the presence of recombinant plasmids ?
13) What is a cDNA library ?List two advantages of a cDNA library over a genomic library.
14) What are single nucleotide polymorphisms ? With the help of any two examples explain the relevance of studying SNPs.
15) Why are Ti-plasmid based vectors disarmed ? Where is the gene of interest incorporated in this plasmid ?
16) What is a callus and how can callus cultures be maintained for prolonged periods? List two applications of callus cultures.
17) What is meant by the term "totipotent"? Are all plant cells totipotent?
18) What is the advantage of having a poly linker in a cloning vector

Section D

Short answer questions. Answer any six; each question carries a weightage of 2.
19) Enlist the six major steps in plant tissue culture. Name a medium commonly used for culturing plant parts and what factors dictate the choice of media ?
20.) (a)Why is Agrobacterium tumefaciens regarded as nature's genetic engineer?
(b) Describe vector-mediated and vector-less gene transfer in plants
21) Explain how adoption of biotechnologicalprocess in developed countries can cause economic hardships in developing countries

22) Give an account of the application of nanotechnology in life science.

23)What is the mechanism of gene action of the production of drought resistant plants?
24)What are type II restriction endonucleases (RE) ? Give an example of a type II RE that generates blunt ends and the sequence recognised by it. Explain how REs are named. Mention two other enzymes and their utility in cloning experiments.
25) Schematicaly depict the method of recombinant DNA technology and name two methods of introducing recombinant DNA into host cells
26 What is a DNA probe ? Explain the principle of maxam and Gilberts method of DNAsequencing.

Section E

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Essay .(Each question carries a weightage of 4) Answer any one
27) Explain the genetics of nitrogen fixation.Give a brief account of regulation of nif gene expression.

28) What are the basic steps of a polymerase chain reaction (PCR) ? How can we selectively amplify a DNA fragment ? Write two applications of PCR.
29) Write an account on the biotechnology of photosynthesis

	Multiple choice 1	Fill in the blanks 1	True/ false1	Match the following 1	Short answer weightage 1	Short answer weightage 1	Short essay weightage 2	Essay weightage 4
knowledge	6	2	4	4		2	3	1
comprehension		2				3	1	2
application	1							
analysis					4	2	3	
synthesis	1							
evaluation							1	

B.Sc. Plant Science/Botany

CORE– 15

ENVIRONMENTAL SCIENCE AND PHYTOGEOGRAPHY

Course Code: 6B15 PLS/ BOT
No. of credits- 3
No. of contact hours- 54 + 18

Aim of the Course

The dynamic nature of biosphere, interrelationships among individuals *etc*. can impart need for conservation in students.

Objectives:

- To enable the student to understand the fundamentals of environmental science
- To enable them to contribute meaningfully in the conservation of the environ ment'.
- To make them aware of the current global problems of the environment due to human itervention.and the need of developing a sustainable way of life
- To appreciate bio diversity and the importance of conservation strategies
- The need of research/database for the conservation and sustainable exploitation.
- To make them aware of the global ecological crisis.

Course Outline

Module-1-introduction 3Hrs

Basic principles and concepts of ecology and environment-Interdisciplinary approach-Subdivisions and development of ecology - Scope and relevance to society and human environment. Need for public awareness.

Module-2 Ecosystem 6 Hrs

Definition, ecosystems-concept of an ecosystem –structure and function of an ecosystem. a) Abiotic factors: Climate shapes the character of ecosystem. Edaphic factors. b)Biotic factors. Human activity is placing the biosphere under increasing stress.

Dynamics of Ecosystem**.** Energy flow in an ecosystem , food chain.-Food web and ecological pyramids. Biogeochemical cycle:Gaseous-Carbon ,Oxygen & Nitrogen. Hydrological- Water; Sedimentary -Phosphorous ,Calcium & Sulphur.Bio diversity promotes ecosystem stability.

Module 3-Ecological concept of species and community 8Hrs

Autecological levels (genecology)- ecads, ecotypes, ecospecies-ecosystem level- ecological niche-spatial, trophic, multifactor or hypervolume niche- ecological equivalences- ecological indicators.Community Ecology :Community characteristics-Species diversity , dominance, co-existence, structure and interdependence - Clementsian units of vegetation- formation , association ,consociation and society. Ecological Succession-. Hydrosere and Lithosere. Ecological adaptation of Hydrophytes, Xerophytes, Halophytes, epiphytes and parasites.

Module 4 - Natural resources 9 Hrs

Renewable and non-renewable resources.Natural resources and associated problems.a) Forest resources- deforestation, aforestation, -conservation-protection forestry-chipko movement-production-commercial forestry -socialforestry, Agroforestry - timber extraction, mining, dams and their effects on forest and tribal people. b) Mineral resources- Environmental effects of extracting and using mineral resources. c) Water resources- use and over use of surface water and ground water- floods, droughts . d) Food resources –World food problems, changes caused by agriculture, over grazing ,effects of modern agriculture ,fertilizer pesticide problems, water logging and salinity. e) Energy resources : Growing energy needs, renewable and non-renewable resources, use of alternate energy sources. f) Land resources : Land as a resource, land degradation , man- induced land slides, soil erosion and desertification. g) Equitable use of resources for sustainable life styles.

Module 5- Social issues and the environment 8 Hrs

Environmental pollution a)Definition, causes-effects and control measures. Types of pollution -Air, Water, Solid wastes-management-, radioactive, noise & thermal pollution. Remedial measures.- phytoremediation-environmental cleaning up by plants-Role of an individual in prevention of pollution. Pollution case studies. Role of pollution control board- From unsustainable to sustainable development. Urban problems related to energy. Water conservation- Rain water harvesting and water shed management. Resettlement and rehabilitation of people- its problems and concerns- Environmental ethics: issues and possible solutions- Climate change and Global warming, acid rain, ozone layer depletion, nuclear accidents-Wasteland reclamation-Issues involved in enforcement of environmental legislation- .Public awareness.

Module 6 - Human population and environment 6 Hrs

Population growth, variation among nations. Population explosion-Family welfare program. Environment and human health: Human rights. The Ecological crisis- industrialisation-the human transformation of the earth- human activity is placing the biosphere under increasing stress.growth of the world economy-.urbanisation.-the vulnerable planet.World Earth summits and protocols-Rio,Kyoto.Johannesberg.The failure of ecological reforms-Enviornmental revolution.

Module 7-Biodiversity and its Conservation 6 Hrs

Biodiversity-Concepts of biodiversity -Types of biodiversity-measurement of biodiversity- biodiversity in India. India as mega diversity nation- hotspots of biodiversity ,threats to biodiversity, Red data book. Conservation of biodiversity-keystone species, flagship species : The conservation strategies are multidimensional.. -National parks, wildlife sanctuaries.

Practical- 15 hrs

1) Visit a local polluted site and documentation of major pollutants/Reserve forest.
2) Study of plant community by quadrat method.
3) Observation and study of different ecosystems mentioned in the syllabus.
4) Study of ecological and anatomical modification of xerophyte, hydrophyte and parasites.
5) Estimation of DO and BOD
6) Knowledge of ecological instruments-hygrometer,rain gauge, anemometer, altimeter, luxmeter, wet and dry bulb thermometer, salinometer, water sampler, GPS(with the help of equipment/digram or photograph)
7) Submit the report of polluted site/reserve forest.
8) Submit the report of quadrat method at five sites.

Module 8-Phytogeography 8hrs

Principles of phytogeography-Continental drift, age and area concepts, types of distribution-Continuous, discontinuous and endemic.-Theories of discontinuous distribution: Theory of land bridges.-Aims and methods of migration and dispersal.-Topographic factors-Altitude, latitude, direction of mountain ranges and valleys, -steepness of slope and exposure. GPS, Remote sensing.-Vegetation types of India.

Practical- 3hrs

Preparation of map of India, to show distribution of vegetation types.

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Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Theory -Plant Science/Botany**-Model Question Paper**

CORE COURSE – 15

6B15PLS /BOT - **ENVIRONMENTAL SCIENCE AND PHYTOGEOGRAPHY**

Time: 3 Hours **Total Weightage: 30**

Draw diagrams wherever necessary

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) A taxon facing high risk of extinction in the wild is identified as
a) endangered b) critically endangered c) vulnerable d) extinct

ii) Kyoto protocol is related to
a) ozone layer depletion b) green house effect c) water pollution d) conservation of wild life

iii) Global human population
a) 6 billion b) 3 billion c) 10 billion d) 5 billion

iv) The disease which spread through water
a) typhoid b) tuberculosis c) Malaria d) AIDS

2. State true or false

i) Mangrove plant is a halophyte.
ii) National park is an example of *ex-situ* conservation.
iii) Atmosphere is a source of resources.
iv) Forest is a type of renewable resource.

3. Fill in the blanks

i) Ecosystem with maximum primary productivity is …….
ii) The two major vegetation types in India are ……and ……..
iii) Age and area theory was proposed by ……
iv) The elimination of ……type of species will seriously affect the ecosystem.

4. Rearrange column B and C to match column A

i)	Biodegradable pollutant	Cotton dust	Eutrophication
ii)	Secondary pollutant	D.D.T	Emphysema
iii)	Non degradable pollutant	Photochemical smog	Biomagnification
iv)	Particulate pollutant	Sewage	Byssinosis

5. Answer in one word or in one sentence

i) World Environment Day.
ii)Psammophyte
iii)When and where the first earth summit was held?
iv)Endemism

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Habitat and niche
7. Saprophyte and parasite
8. Primary succession and secondary succession
9. Alpha diversity and beta diversity
10. Hydrologic cycle and sedimentary cycles
11. Biomagnification and bioaccumulation

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. Give any two reasons for depletion of plant resources
13. Briefly explain the ecosystem services or indirect benefits provided by the ecosystems.
14. Enumerate the ill effects of acid rain.
15. In ecotypes variations are genetically fixed. Comment on this statement.
16. What is ozone depletion?
17. List out the reasons for the population explosion.
18. Comment on ecological niche.

Section D

Answer any ***Six***

(Short essay- type questions*;* each question carries a weightage of 2)

19. Describe the various adaptations of Halophytes.
20. Mention any five forest types in India with examples.
21. Write short note on continental drift.
22. Give a short account on alternate energy resources.
23. What are the causes and remedies of radioactive pollution?
24. Give a short account of ecological indicators.
25. 'Chemical fertilizers and pesticide cause problems to environment'. Comment on this statement.
26. What are ecotypes? Describe the various types.

Section E

Answer any **One**

(Essay- type questions; Each question carries a weightage of 4)

27. What is sustainable development? Explain with reference to global environmental crisis.
28. Explain the causes, effects and effective control measures of water pollution.
29. Write an account of the phytogeographic regions of India.

KANNUR UNIVERSITY EXAMINATION
Plant Science/Botany- **B.Sc. Practical**

CORE-16
Core Practical-II)
MICROBIOLOGY, MYCOLOGY, PHYCOLOGY, LICHENOLOGY, BRYOLOGY, PTERIDOLOGY, GYMNOSPERMS AND PLANT PATHOLOGY.

Course code: 6B16PLS/ BOT
Contact hours -69
Credit-4

Aim & Objectives

1. To train the students in the use and maintenance of scientific equipments in biology.
2. To develop in them the scientific way of doing and making them understand that there are many models of experimentation that are possible.
3. To enable the students to identify the different organisms by morphological and anatomical studies.

Eligibility to appear for Core practical -2 (6B16BOT/PLS) External Examination

1. Certified Practical record

Course Outline

Microbiology- Practicals (6 hrs)

1) Micropreparation and identification of Nostoc.
2) Isolation and purification of Bacteria - Streak plate method.(Demonstration only)
3) Gram staining.
4) Isolation of Rhizobium from root nodules of leguminous Plants.
5) Study of motility by hanging drop method.
6) Identify TMV, HIV and Bacteriophages from the photographs.

Mycology Practical (12 hrs)

1) Make micro preparations of vegetative and reproductive structures of the following types: Pythium, Rhizopus, Saccharomyces, Aspergillus, Peziza, Puccinia, Agaricus, Cercospora
2) Make labelled sketches of the specimens observed

Phycology Practical (16hrs)

1) Make Micro preparation of vegetative and reproductive structures of the following types- Chlorophyceae - Chlorella, Volvox, Ulothrix, Cladophora, Zygnema, Oedogonium and Chara. Xanthophyceae – Vaucheria; Bacillariophyceae – Pinnularia; Phaeophyceae- Sargassum; Rhodophyceae- Polysiphonia
2) Make labelled sketches of Specimens observed

Lichenology Practical (2 hrs)

1) Make micropreparation of vegetative and reproductive parts of Usnea. Make sketches of the specimens observed.

Plant Diseases Practical (**3 hrs.)**

1) Identify the diseases mentioned in the syllabus with respect to causal organism and symptoms.
2) Students should be trained to prepare the fungicide Bordeaux mixture and Tobacco decoction.

Bryology,Practical- (12 Hrs)

1. *Riccia*- habit-internal structure of thallus-V. S. of thallus through archegonia, antheridia and sporophyte
2. *Marchantia*-.habit, thallus v.s, thallus with archegonial receptacle, antheridial receptacle, male receptacle V.S, female receptacle V.S, T.S of thallus through gemmae cup, V.S of sporophyte..
3. *Anthoceros*- habit-internal structure of thallus-V. S. of thallus through archegonia, antheridia, sporophyte V.S.
4. *Funaria*- habit, V.S.of archegonial cluster, V.S.of antheridial cluster, sporophyte V.S.

Pteridology Practicals- (12 Hrs)

1. *Psilotum* : external features, stem T.S., synangium T.S
2. *Selaginella:* habit , rhizophore T.S, stem T.S ,axis with strobilus, Megasporophyll and Microsporophyll

3.*Equisetum* – Habit, rhizome T.S, stem T.S., strobilus V.S.

4 *Pteris*- Habit, petiole T.S., sporophyll T.S., prothallus

5. *Marsilea*- Habit, rhizome and petiole T.S, Sporocarp T.S, V.S & R.L.S.

Gymnosperms Practicals- (12 Hrs)

1. *Cycas*- seedling, coralloid root-entire and T.S., leaflet T.S, petiole T.S., male cone L.S., microsporophyll, micro sporophyll T.S., megasporophyll, ovule entire and L.S.
2. *Pinus* – Branch of indefinite growth, spur shoot, T.S of old stem, needle T.S., male cone, male cone V.S., female cone, female cone V.S.
3. *Gnetum*- Habit, stem T.S(young and mature), leaf T.S, male strobilus, female strobilus, V.S of male cone, V.S. of female cone, V.S of ovule, seed entire.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany- **B.Sc. Practical- Model Question Paper**

(Core Practical-II)

6B16PLS /BOT -**MICROBIOLOGY, MYCOLOGY, PHYCOLOGY, LICHENOLOGY, BRYOLOGY, PTERIDOLOGY, GYMNOSPERMS AND PLANT PATHOLOGY.**

Time: 3 Hours **Max. Weightage= 30**

1. Make suitable micro preparations to bring out the structure of **i), ii), iii), iv)** and **v)**. Draw a cellular diagram of each and label the parts. Identify giving reasons and leave the preparation for valuation.

(Preparation-1, identification with reasons-1, labeled diagram-1) **(Weightage- 3x5= 15)**

2. Separate and identify any two algal specimens from the mixture **vi)**.

(Separation & preparation-0.5; identification with reasons-1)

(Weightage-1.5x2 = 3)

3. Perform the Gram staining of bacterial solution **vii)** and show the result. Write the procedure

(Procedure-1; Skill- 1; Result- 1) **(Weightage -3)**

4. Identify the disease, name of pathogen and give important symptoms of **viii)**

(Disease-0.5; Pathogen-1; Symptoms-1.5) **(weightage-3)**

5. Spot at sight ix), x), xi), xii), xiii) and xiv) **(weightage 1x6=6)**

KEY TO THE SPECIMENS

- **i)** Alga mentioned in the syllabus
- **ii)** Fungus mentioned in the syllabus
- **iii)** Bryophyte mentioned in the syllabus
- **iv)** Pteridophyte mentioned in the syllabus
- **v)** Gymnosperm mentioned in the syllabus
- **vi)** Algal mixture(Mixture of different algae prescribed in the syllabus, containing at least four members)
- **vii)** Bacterial solution
- **viii)** Plant disease mentioned in the syllabus
- **ix)** Alga
- **x)** Fungus
- **xi)** Lichen
- **xii)** Bryophyte
- **xiii)** Pteridophyte
- **xiv)** Gymnosperm.

Scheme of questions

Quest. No.	Subject	Weightage
1	Phycology, Mycology, Bryology, Pteridology and Gymnosperm	15 (3 each)
2	Phycology	3
3	Microbiology	3
4	Plant Pathology	3
5	Phycology, Mycology, Lichenology, Bryology, Pteridology and Gymnosperm	6 (1 each)
	Total	30

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany- **B.Sc. Practical**

(Core Practical-III)

ANGIOSPERM ANATOMY, ANGIOSPERM MORPHOLOGY, SYSTEMATICS, REPRODUCTIVE BOTANY, PLANT PHYSIOLOGY, UTILITY OF PLANTS, MEDICINAL BOTANY, ENVIRONMENTAL SCIENCE, BIOTECHNOLOGY AND MOLECULAR BIOLOGY

Course code: 6B17PLS/BOT
Contact hours – 162 Hrs
Credit-4

Aim & Objectives.

1.To train the students in the use and maintenance of scientific equipment in biology.

2.To develop in them the scientific way of doing and making them understand that there are many models of experimentation that are possible.

3. To enable the students for a comparison existing among different parts in different plants. and for identifying different plants by anatomical peculiarities

4. To enable the student to understand the fundamentals of environmental science

Eligibility to appear for Core Practical-III (6B17BOT/PLS)Examination

1. Certified Record
2. ,, Herbaium sheets and field book
3. ,, Tour /visit report
4. ,, Collections

Course Outline

Angiosperm Systematics **48 Hours**

1.Study of taxonomic features and *economic importance of representative members of the following families: Annonaceae, Nymphaeaceae, Capparidaceae, Malvaceae, Rutaceae, Anacardiaceae, Papilionaceae, Mimosaceae, Caesalpiniaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Scrophulariaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Zingiberaceae, Liliaceae, Arecaceae, Poaceae.

2.Construction of dichotomous keys for the easy identification of members of the family Papilionaceae, Rubiaceae and Euphorbiaceae.- demonstration only.

3.A minimum of 30 herbarium specimens representing all the prescribed families with field notes on at least 50 plants collected including any common local plants.

4. Identification of herbarium specimens and local plants.

5.Field trip to learn the plant diversity and characteristics of plant families under the supervision of teachers for at least 7 days.

*economic importance - *Annona, Mangifera, Anacardium, Eucalyptus, Mimosa pudica, Saraca indica, Coccinia indica, Ferula asafoetida, Ixora, Cinchona, Eclipta alba,Vernonia,*

Gymnema, solanum torvum, Scoparia dulcis, Coleus aromaticus, Amaranthus viridis, Ricinus communis, Allium cepa, Allium sativum, Cocos, Oryza.

Angiosperm Morphology 6 Hours

1. Leaf submission as an album to study the diversity in leaf shape, tip, base, margin and venation
2. Identify with a note the different types of inflorescence, fruits and placentations.
3. Submission of preserved materials of various inflorescences of racemose, cymose and mixed/special types.

Angiosperm Anatomy 26 hrs

1. .Non living inclusions – Cystolith, Raphides, Aleurone grains.
2. .Starch grains – Eccentric, concentric, compound
3. .Apical meristem – Root apex and stem apex.
4. .Simple permanent tissues – Parenchyma, Chlorenchyma, Aerenchyma, Collenchyma and Sclerenchyma.
5. Primary structure – Dicot stem – Hydrocotyle, Cephalandra, Eupatorium or any dicot stem.
6. Monocot stem – Bamboo, Grass, Asparagus or any monocot stem.
7. Dicot root – Tinospora, Ficus, Pea
8. Monocot root – *Colocasia, Hedychium, Pandanus* or any monocot root.
9. Secondary structure – Stem (Normal type) – *Tinospora, Thithonia, Vernonia* or any other normal type.
10. Secondary structure – Root (Normal type) – *Tinospora, Ficus, Carica papaya, Ricinus* or any other normal type.
11. Secretory tissues – Resin canal, Nectory, Latex vessel, Lysegenous and schizogenous cavities, Laticifers – articulated and non-articulated latex vessels.
12. Epidermal structures – Trichomes, Hairs, Glands, Stomata.
13. Anomalous secondary thickening – *Bignonia, Dracaena, Boerhaavia*.
14. Leaf Anatomy – Dicot leaf: *Ixora*; Monocot leaf: Grass

Reproductive Botany - Practicals (10 hrs)

1.Identify C.S of Anther; Dicot embryo, Monocot embryo and eight nucleated embryo sac.

2.Study of the different stages of anther development.

3.Pollen germination test.

4.To dissect and display early stages of embryo development- *Tridax/ Crotalaria*.

Plant Physiology Practicals (18Hrs)

13. Determination of water potential by tissue weight change method
14. Water potential of onion peel/Rheo peel by plasmolytic method
15. Effect of temperature on permeability

16. Papaya petiole osmoscope/simple osmoscope/potato tuber osmoscope
17. Determination of stomatal index
18. Comparison of rate of transpiration by the upper and lower surface of the leaf by cobalt chloride method
19. Relationship between water absorption and transpiration
20. Determination of the rate of transpiration using Ganongs potometer
21. Effect of scarification on seed germination
22. Photomorphogenesis in seedlings grown under normal light and darkness
23. Testing of seed viability by tri phenyl tetrazolium chloride..
24. Determination of gravitropism using clinostat

Plant Biotechnology **18 hrs**

1. Isolation of DNA from plant tissues.
2. Production of callus
3. visit to a well equipped biotechnology laboratory.

Environmental Science and Phytogeography **15 hrs**

1. Visit a local polluted site and documentation of major pollutants/Reserve forest.
2. Study of plant community by quadrat method.
3. Observation and study of different ecosystems mentioned in the syllabus.
4. Study of ecological and anatomical modification of xerophyte, hydrophyte and parasites.
5. Estimation of DO and BOD
6. Knowledge of ecological instruments-hygrometer,rain gauge, anemometer, altimeter,luxmeter, wet and dry bulb thermometer, salinometer, water sampler, GPS(with thehelp of equipment/digram or photograph)
7. Submit the report of polluted site/reserve forest.
8. Submit the report of quadrat method at five sites.

Phytogeography **Practical:** **3hrs**

Preparation of map of India, to show distribution of vegetation types.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany**- B.Sc. Practical- Model Question Paper**

BOTANY (Core Practical-III)

Course Code: 6B17PLS/ BOT

Angiosperm Anatomy, Angiosperm Morphology, Systematics, Reproductive Botany, Plant Physiology, Environmental Science, Biotechnology and Molecular Biology

Time: 3 Hours **Max. Weightage= 30**

1. Take a T.S. of material **i)** stain and mount in glycerin, draw a cellular diagram of a portion enlarged, Label the parts, identify giving reasons. Leave the preparation for valuation
(Preparation- 1; labeled diagrams- 1; identification 0.5; reasons 1.5) (Weightage-4)

2. Take a T.S. of material **ii)** and identify the ecological group and comment on its adaptations
(Ecological group-0.5; adaptations-1) (weightage-1.5)

3. Describe the given specimen **iii)** in technical terms. Classify the specimen to its respective family giving reasons. Give a floral diagram and floral formula Draw labelled diagram of the L.S. of flower
(Technical description of Vegetative Characters- 0.5; Technical description of Floral Character- 1; Identification of the family- 0.5 ;Reasons- 0. 5; Floral Formula- 0.5; Floral diagram - 0.5; Labelled diagram of L.S of the flower-0.5) (Weightage- 4)

4. Identify, classify and describe the vegetative and floral characters of specimen **iv)** giving reasons **(weightage 2)**

5. Dissect out the embryo of **v)** and mount; draw a labeled diagram and identify the stage, giving reasons.
(Preparation-1; labeled diagram-0.5; identification-0.5; reasons-0.5)
(Weightage-2.5)

6. Calculate the abundance, density and frequency of each species in the given quadrat table **vi)** **(Abundance-1; Density-1; Frequency-1) (weightage-3)**

7. Write the anatomical features of the specimen **vii)**. **(Weightage-1)**

8. Identify and write notes on **viii**) **(weightage -1)**

9. Give the binomial and family of **ix**), **x), xi)** and **xii)**
(Binomial-0.5; Family-0.5) (Weightage-1x4=4)

10. Give the binomial, family and exact morphology of useful part of **xiii)** (**weightage-2)**
(**Binomial-1, Family-0.5, Morphology-0.5)**

11. Set up the physiology experiment using the materials supplied **xiv**) and explain its principle and working
(Explanation-1; Experimental Set up- 1) (weightage2)

12. Calculate the stomatal index of the given leaf **xv)** **(weightage 2)**

12. Spot at sight **xvi)** and **xvii)** **(weightage 0.5x2=1)**

KEY TO THE SPECIMENS

i) Anatomy- stem or root as per the syllabus

ii) Any Ecology specimen mentioned in the syllabus

iii) Plant/ twig with large flowers and buds from any dicot families as per syllabus

iv) Plant/ twig with flowers from any family (not necessarily from the syllabus)

v) *Tridax/Crotalaria* fruit

vi) Quadrat Table consisting of 3 species

vii) Any anatomy material as per syllabus

viii) Fruit/ inflorescence/ Leaf type/ Placentation

ix) Campus plant belonging to the family

x) Campus plant belonging to the family

xi) Herbarium specimen

xii) Herbarium specimen

xiii) Type mentioned in the Angiosperm systematics syllabus

xiv) Physiology experiment

xv) Leaf

xvi) Instruments

xvii) (Environmental science/ Biotechnology/ Molecular Biology)

Scheme of questions

Quest.No.	Subject	Weightage
1	**Angiosperm Anatomy**	**4**
2	**Environmental Science**	**1.5**
3	**Systematics**	**4**
4	**Systematics**	**2**
5	**Reproductive Botany**	**2.5**
6	**Environmental Science**	**3**
7	**Angiosperm Anatomy**	**1**
8	**Angiosperm Morphology**	**1**
9	**Angiosperm Systematics**	**4 (2 each)**
10	**Angiosperm Systematics**	**2**
11	**Plant Physiology**	**2**
12	**Plant Physiology**	**2**
13	**Environmental Science/Biotechnology / Molecular Biology**	**1 (0.5each)**
	Total	**30**

C**ORE– 18**

PROJECT WORK/FIELD VISIT/STUDY TOUR

Course Code: 6B18 PLS/ BOT
No. of credits- 2
No. of contact hours-

Aim

To practice the skills/theoretical knowledge acquired during the programme to find out and experience the method of science.

Objectives of the Course

1.Project work will kindle the spirit of research and invention among the students and will expose them to the realitities outside their classrooms. It will impart sufficient academic and practical experience and motivate them to become self employed in the particular field.

2.To have an acquaintance with scientific report writing, data analysis *etc.*

3.Field visit/ Study tour provides an opportunity to appreciate the environment, ecology and biodiversity aspects of plants.The dynamic nature of biosphere, interrelationships among individuals *etc*. can impart need for conservation in students.

Course Outline

Project Work:

Each student must submit a duly certified report of a project work carried out by him related to the elective paper or any topic related to Botany at the end of the sixth semester. Topic of the project shall be given during the earlier semesters, so that projects could be done during the semester-breaks. The students may be grouped into different batches assigning projects of different topics. Try to maintain individual differences in the data and the preparation of dissertation; evenif students do the same project work as a group under the guidance of a teacher. Then involvement of the students in the project may be also considered in the evaluation of the dissertation, since there is an internal examiner for the evaluation of the project.

The project report may be certified by the supervising teacher and the Head of the Department.

Viva-voce:

The students are required to appear for a viva-voce during the practical examination of the sixth semester. Viva-voce will be based on the research methodology and the content of the project.

Field Visit

Field trip to learn the plant diversity and characteristics of plant families under the supervision of teachers for at least 7 days.

Submission: Submission of herbarium / collection of plants from different groups/permanent slides/Tour/Visit Report

PROJECT EVALUATION /FIELD VISIT /SUBMISION

Course Code: 6B18 PLS /BOT
No. of credits- 2

Internal Evaluation	**Total**	**weightage 10**
1 Presentation of the project(seminar) with discussion and open questions .		weightage 5
2 study tour /field visit		weightage2
3 Submission of herbarium / collection of plants from different groups /permanent slides		weightage 3
External Evaluation	**Total**	**weightage 30**
1 Project Dissertation		weightage 20
2 project presentation by the student		weightage 3
3 Viva voce on the basis of project and related subject		weightage 7

ELECTIVE COURSE

(**6B19 PLS**/ BOT)

1. **Utility of Plants and Medicinal Botany**
2. **Plantation Botany**
3. **Nursery Management and Mushroom Cultivation**
4. **Ethnobotany**
5. **Pharmacognosy**
6. **Seed Technology**

B.Sc. Plant Science/ Botany
ELECTIVE COURSE- 1.**UTILITY OF PLANTS AND MEDICINAL BOTANY**

Course Code: 6B19 PLS / BOT (i)
No. of credits- 2
No. of contact hours- 36

Aim of the Course
To enable the proper description, identification, naming and classification of higher plants- angiosperms- to conserve.

Objectives:
1 This study enriches the systematic Botany which can be utilized for botanical diagnosis of fragmentary crude drugs.
8. This study will be useful in identifying medicinal taxa.
9. This study also helps in knowing the preliminary phytochemistry of plant organs

Course Outline

Module 1- Utility Of Plants 18 Hrs

Study of the Botanical name, Family, Morphology of useful parts and utility of the following:

Cereals and millets : Rice,Wheat, Maize, Ragi

Pulses- Bengal gram, Black gram, Green gram, Horse gram, Pigeon pea, Cow pea, Soya bean, Green peas.

Fruits & Vegetables- Banana, Jackfruit, Pineapple, citrus, Apple, Cashew, Watermelon, Tomato, Brinjal, Common bean, Sword bean, Pumpkin, Cucumber, Snake gourd, Bitter gourd, Ash gourd, Bottle gourd.

Spices and condiments- Cinnamon, Clove, Cardamom, All-spice, Star-anise, Coriander, Cumin, Fennel, Nutmeg, Pepper, ginger, Tamarind

Sugar-yielding plants- sugarcane, Sweet potato, sugar beet.

Fibre yielding – Cotton, Coir, Jute

Dyes - Indigo, Henna

Latex yielding - Para rubber

Tuber crops - Tapioca, Yam, Carrot, Potato, Colocasia.

Oil yielding - Sesame oil, Palm oil, mustard oil, Coconut oil.

Beverages-Tea ,Coffee, Cocoa.

Practical-

1. Study of the raw materials or direct products, mentioned in the syllabus.
2. Collection & submission of Economic Botany materials, representing atleast one from each group.

Module 2- Medicinal Botany 18 hrs

1. Ethnomedicine: Scope, interdisciplinary nature, Outlines of Ayurveda, Sidda, Unani and Homeopathic systems of traditional medicine. Role of AYUSH, NMPB, CIMAP, CDRI and CMPR Kottakkal
2. Plants in primary health care: Common medicinal plants –Tinospora cordifolia, Ocimum, Acorus, Adhatoda, Sida,
   Turmeric, Leucas, Aloe.
3. Traditional medicine vs Modern medicine: Study of select plant examples used in traditional medicine as resource (active principles, structure, usage and pharmacological action) of modern medicine: Aswagandha (Withania somnifera), Sarpagandha (Rauvolfia serpentina), Phyllanthus amarus, Amla (Phyllanthus emblica) Asoka (Saraca indica) and Brahmi (Bacopa monnieri)
4. Pharmacognosy- Introduction and scope, Adulteration of plant crude drugs and methods of identification - some examples; Indian Pharmacopoeia
   Sources of crude drugs-roots, rhizome, bulb, corm, leaves, bark and wood, resins and gums, bud and flowers, fruits and seeds.

Practicals

1. Local field visits to and study the vegetation and flora to acquire knowledge to identify them on the spot.
2. Morphological study of medicinally important part(s) of locally available plants- minimum ten plants used in traditional medicine.
3. Field visit to collect and identify ethnomedicinal plants used by local tribes.
4. Raise at least five medicinal plants in the campus and submit a report.

References

1. Anil K Dhiman.2003. Sacred Plants and their medicinal uses. Daya publishing house New Delhi.
2. Jain S K 1981. Glimpses of Indian ethnbotany. Oxford and IBH New Delhi.
3. Jain S K 1990. Contribution Indian ethnobotany. Scientific publishers Jodhpur
4. Jain S K.1996. Ethnobotany in human welfare. Deep publishers. New Delhi
5. Jyothiprakash E J 2006. Medicinal botany and pharmacognosy. Emkay Publishers New Delhi
6. Maheshwary J K2000. Ethnobotany and medicinal plants of Indian subcontinent. Scientific publishers
7. Singh G K and Anil Bhandari 2000. Textbook of Pharmacognosy. CBS publishers N.Delhi.
8. Verma V 2009. Text book of Economic Botany. Ane Books, New Delhi.

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ELECTIVE COURSE -2.PLANTATION BOTANY
Course Code: 6B19 PLS /BOT (ii)
No. of credits- 2
No. of contact hours- 36

Aim and Objectives of the Course

1.To enable proper understanding of different types of Plantation Crops.
2.To orient the students regarding crop propagation methods and agronomic practices.

Course Outline

Module-1 plantation crops and their importance 6 Hrs

Importance of Plantation Crops in the economy of India

Present status of plantation crops in Kerala

Study of the plantation crops mentioned below in relation to importance, origin, distribution, morphology, taxonomy, floral biology, morphology and biochemistry of the useful parts-Tea, Coffee, Rubber, Coconut, Arecanut and Cashew.

Module-2 crop propagation 6Hrs

A detailed study of crop propagation and importance of the above crops with special reference to :-

a) improved methods of propagation- budding, grafting, layering
b) in vivo and in vitro methods of rapid multiplication
c) nursery practices-production of planting materials
d) plant introduction and selection techniques

Module-3 cultivation 6Hrs

A detailed study of the agronomic practices of the crops mentioned with special reference to :-

a) soil and climate
b) land preparation and planting techniques
c) organic manure- green manure, compost, farmyard manure
d) micro and macronutrients- management of fertilizers
e) chemical fertilizers-nitrogen, potassium and phosphorus
f) growth regulators- natural, synthetic

Module-4 Diseases and their management 6Hrs

Study of the symptoms, etiology, crop loss and management of the major pests and diseases of the crops mentioned earlier

Traditional disease management strategies-Major plant protectants-fungicides, bactericides, pesticides and herbicides-Biological control of pests and diseases- integrated pest and disease management.

Module-5 Harvesting and processing 6Hrs

Study of the harvesting, storage, processing and marketing of the economically important products of the crops mentioned earlier

Practicals **6Hrs**

1. Collection, identification and submission of the herbarium specimens of the crops mentioned, in the syllabus.
2. Field observations on the floral biology of the crops
3. Practice special techniques of propagation- budding, grafting and layering.
4. Study and identification of improved varieties of crops mentioned in the syllabus.
5. Visit to plantations to study harvesting and processing techniques of major crops (field visit under the supervision of teachers).
6.

References

1. Bavappa KVA, Nair MK and Kumar TP(1982), The Arecanut Palm, CPRI.
2. CCRI (1985), Coffee Guide, Coffee Board R&D Chikmangalore.
3. Child R(1974) Coconuts(Edn. 2) Longman
4. Chopra, VL and Peter, KV(2005), Handbook of Industrial crops, Routledge.
5. Narayanan PK, 1976, Rubber and its cultivation, Rubber Board
6. Parthasarathy V.A., P.K. Chattopadhyay and T.K. Bose. 2006, (eds.) Plantation Crops, Vol. 2., Naya Udyog, Kolkata
7. Rajan, S and Markose BL, (2007), Horticulture series, Vol.6, Propagation of Horticultural Crops, New India Pub., New Delhi.

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ELECTIVE COURSE-3.NURSERY MANAGEMENT AND MUSHROOM CULTIVATION

Course Code: 6B19 PLS/ BOT (iii)
No. of credits- 2
No. of contact hours- 36

Course Outline

Module-1-Nursery Management 12 Hrs

Introduction and scope- Layout of Nurseries- importance of nursery- propagation structures and soil mixtures-soil preparation-soil treatment-garden tools and implements-preparation of nursery beds-organic manure and fertilisers-irrigation methods-preplanting treatments-maintenance of nursery—transplantation and aftercare

Module-2 Plant Growing Structures - 4Hrs

Plant growing structures-advantages of growing in green houses, Hotbeds, cold frames

Module-3 Media for propagation - 4 Hrs

Characteristics of media-common media for propagation-soil, sand, peat, sphagnum moss, vermiculite, soil mixture and preparation of nursery beds

Module -4 Mushroom cultivation 4Hrs

Introduction- nutritional value of mushrooms-edible mushrooms and poisonous mushrooms

Module-5 Mushroom cultivation- Proceure 6Hrs

Building and layout-composting-peak healing-spawn and spawning-crop management-picking-grading and packing-cultivation of white button mushroom(*Agaricus bisporus*) and Paddy straw mushroom(*Pleurotus spp.*)

Practicals 6Hrs

1. Preparation of potting mixture of known combination and potting in earthen pots or polythene bags
2. Preparation of compost/wormicompost using different substrates
3. Plant propagation techniques-budding, layering, grafting
4. Preparation of Bordeaux mixture
5. Visit to a well established nursery
6. Practical methods of mushroom culture

References

1. Goplaswamy Iyengar, KS, Complete Gardening in India,4th edn.

2. Harander Singh(1991), Mushrooms- The art of Cultivation, Sterling Publishers Pvt. Ltd., New Delhi.
3. Harold Davison, Roy Mecklenburg and Curtis Peterson(2009) Nursery Management 4th Edition, Culinary and Hospitality Industry Publications Services.
4. IMGA, Indian Journal of Mushrooms, Mushroom Research Laboratory, College of Agriculture, Solan.
5. IMGA, Mushroom Cultivation in India-Special Prized Bulletin, IMGA College of Agriculture, Solan.
6. Kumar, N.(1994) Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
7. Manibhushan Rao, K (1991) Text Book of Horticulture, Macmillan, India, Ltd.
8. Nita Bahl(1995), Handbook on Mushrooms 3rd Edn. Oxford and IBH Publishing Co., New Delhi.
9. Peter Mc Hoy(1984), Garden Planning and design, Blandford Press, UK.
10. Ram, RC,(2007) Mushrooms and their cultivation Techniques, Aavishkar Pub.,Jaipur.

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ELECTIVE COURSE - 4. ETHNOBOTANY
Course Code: 6B19 PLS / BOT **(iv)**
No. of credits- 2
No. of contact hours- 36

Course Outline

MODULE 1- (6hrs)

Ethnobotany- Introduction, definition, scope and categories of ethnobotany, significance direct relationship of plants with ethnic groups. Importance of morphological characters and physical properties in ethnobotanical study.

MODULE 2 (4hrs)

Linkage of ethnobotany with other sciences and disciplines. Anthropology, History, and Agriculture.

MODULE 3 (5hrs)

Linkage of ethnobotany with food and nutrition, medicine, sociology and culture, religion and social customs.

MODULE 4 (10hrs)

Ethnic agricultural practices-shifting cultivation, cultivation of slopes, seed preservation, control measures for the protection of seeds- various traditional practices of rice cultivation followed by ethnic groups and medicinal uses of rice.

MODULE 5 (8hrs)

Sacred groves – various names attributed to sacred groves in native language-socioreligious belief-sacred groves and their role in the preservation of gene pool-Important plant ecosystems preserved in Kerala by religious beliefs.

MODULE 6 (3hrs)

Umbrella stones- Historical background – location of umbrella stones in Kerala ethnobotanical interest of umbrella stones.

PRACTICALS

1. Visit to 3 sacred groves nearby and study the area covered and the type of plants (collection of plants not expected)
2. Visit to Umbrella stones of Central Kerala.
3. Submit the detailed report of 1 and 2 to illustrate the ethnobotanical interests of sacred groves and Umbrella stones.

4. Collection of some important medicinal plants on folklore information and preparation of herbarium (minimum 10 sps.)
5. Ethnobotanical field work in the locality. Identification and study of 15 plants of ethnobotanical interests (Taxonomic descriptions and chemical contents of the plants are not expected) Submit the herbarium.

REFERENCES

1. Dey,A.C.1998 **Indian Medicinal Plants and Ayurvedic Preparations**-Bishen Singh – Mahendrapal Singh, Dehra Dun.
2. Jain,S.K **Contribution to Indian Ethnobotany**-Periodical experts, Book agency.
3. Jain,S.K –**Dictionary of Indian Folk medicine and Ethnobotany.**Deep Pub.
4. Jain,S.K **Manual of Ethnobotany –**Scientific pub.-Jodhpur
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10. Ramachandran,S.P.1991,**Recent advances in medicinal,aromatic and spice crops.**Today and tomorrow publications, New Delhi
11. Sivarajan, V.V.Balachandran, **Ayurvedic medicines and their Plant sourses.**
12. Warrier-**Medicinal plants of India ,**Modern book centre, Trivandrum.

B.Sc. Plant Science/ Botany
ELECTIVE COURSE- 5.PHARMACOGNOSY

Course Code: 6B19 PLS/ BOT (v)
No. of credits- 2
No. of contact hours- 36

Course Outline

Module 1- Introduction – meaning and scope of Pharmacognosy - relation to allied fields of study systematic scheme of pharmacognosic study. (5hrs)

Module 2- Historical development of pharmacognosy – centres of origin –Diversity of medicinal plants-Introduction to Ashtanga hridaya- Classification of endemic and exotic plants – General account of medicinal plants used in ayurveda. (5hrs)

Module 3- System of classification of drug from natural resourses- alphabetical classification-Taxonomical classification –Morphological classification –Pharmacological classification – Chemical classification. (5hrs)

Module 4 -Cultivation and collection of crude drugs-cultivation method –soil type- method of extraction of crude drugs. (5hrs)

Module 5- Source of crude drugs-Root, rhizome, tuber, bulb, corm, leaves, stem, flower, fruits and seeds-sources of tannin and dyes. (4hrs)

Module 6- Detailed study of the following plants for their pharmaceutical products-(the study include habit, habitat and systematics of plants mentioned-organoleptic, anatomical, chemical evolution of useful part-Phytochemistry and pharmacological action of the drug- Major Ayurvedic preparation and formulations using raw drug)
Achyranthus aspera ,Adhatoda vasica, Allium cepa, Allium sativum ,Aloe barbedens, Datura alba, Ferula asafetida, Gloriosa superba , Phyllanthus amara,Strychnos mixvomica, Scoparia dulsis, Zingiber officinale, Vetiveria sizanoides. (10hrs)

Module 7-Secondary products- alkaloids, turpenol, phenolics- properties, classification and function- Pharmacological uses. (2hrs)

PRACTICAL

1 Familiarise with atleast 5 folk medicines and report the sourse cultivation and extraction.
2 Identification of the medicinal plants listed in the syllabus.
3 Visit to Ayurveda college or Arya vaidya sala.

REFERENCE

1. Anonymous. **Indian medical plants** (5vol.),Arya vaidya sala, Kottakkal.
2. Arumugham, K.R. and Maragesh,N. **Text book of Pharmacognosy,** Sathya Publishers, Chennai.
3. Atal, C.K. and Kapur ,B.M.1982), **Cultivation and utilization of aromatic plants.**
4. Bose,K,C. **Pharmacopea indica ,**Bishen singh Mahendrapal Sigh,Dehradun.
5. Gokhalae,S.B. **Text book of Pharmacognosy ,** Jai Publishing Co. New Delhi.
6. Kirthikar and Basu **Indian medical plants** (4vol.)International Book distributors. Dehradun.
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B.Sc. Plant Science/ Botany

ELECTIVE COURSE-6. SEED TECHNOLOGY
Course Code: 6B19 PLS / BOT **(vi)**
No. of credits- 2
No. of contact hours- 36

Aim and objectives of the Course

1. This study helps to have a thorough knowledge of the seed structure and different types of seeds.
2. It improves the knowledge of students about storing seeds, seed testing, methods of breaking dormancy and seed certification**.**

Course Outline

Module-1

Seed-formation and development-environmental effects-seed structure-seed coat-embryo-food storage structures-storage reserves-seed classification

Module-2

Seed Germination-general features-morphology and physiology of germination-requirements for germination- seedlings different types

Module-3

seed dormancy-purpose-definition- types -factors affecting dormancy-methods of breaking dormancy-seed burial-seed bank

Module-4

Seed industry-seed handling-Seeds and other methods of propagation –seeds for propagation in agriculture-national and international criteria- Seed longevity-factors affecting-seed storage-cryopreservation-seed storage structures and containers-preparation for marketing-seed viability, vigour, health and moisture content-seed testing-seed certification-legislation-quarantine-methods to improve crop varieties-somatic embryogenesis and organogenesis

Module-5

Seeds and their use by man-agriculture-food-feed-raw material in industry

Practicals

1. Determination of seed moisture content
2. Study the seed viability by tetrazolium chloride test
3. Study the germination percentage of various seeds
4. Break the dormancy of seeds by using different scarification methods

Reference

1. Baskin, CC and Baskin, JM(2001). Seeds: Ecology, Biogeography and Evolution of Dormancy and Germination, Academic Press, San Diego.
2. Bedell, PE. (1998) Seed Science and Technology: Indian Forestry Species.Allied Publishers Limited, New Delhi.
3. Bewley, JD and Black M(1994) Seeds: Physiology of Development and Germination.2nd edn. Plenum Press, New York.
4. Mayer, AM and Poljakoff-Mayber, A(1989) The Germination of Seeds 4th edn. Pergamon Press, England.

Plant science (Core Practical -4)
Horticulture and Herbal Science

Course Code: **6B20PLS**
No. of credits: 2
No. of contact hours: 72

Horticulture Practicals **36 Hrs**

1. Demonstration of vegetative methods of propagation
2. Flower arrangement with cut flowers.
3. Preparation of potting mixture of known combination
4. Visit to a well established nursery.
5. Preparation of 10 herbarium sheets of the plants mentioned in the syllabus

Herbal Science Practicals: **36 hrs**

(1) Identification and description of medicinal plants
(2) Breaking of Dormancy by scarification, acid treatment
(3) Study of viability of different seeds- germination test, Tetrazolium test
(4) Cultivation of medicinal plants
(5) Propagation practices and planting of selected medicinal plants
(6) Collection of seeds of medicinal plants and prepare 10 herbarium sheets of seedlings of various stages
(7) Visit any medicinal garden.

Model Question Paper
Plant science (Core Practical -4) (6B20PLS)
Horticulture and Herbal Science

Time : 3hrs Max Wt :30

1.From the given material i) conduct the process of budding. Write the procedure (**4wt**) procedure(**2**),conducting (**2**)
2.From the given material ii) conduct the process of grafting (**4wt**)
3.From the given material iii) conduct the process of layering,Write the procedure (**5 wt**)
4.From the given material iv) conduct the process of Hybridisation, write the procedure (**5wt**)
5.Identify the disease v) Name the pathogen, mention any two important symptoms and control measures (**3wt**)
6.Identify the herbarium sheets vi) and vii) with botanical name and family (**4wt**)
7.Identify the crop viii) and write the binomial, family and morphology of the useful part (binomial-1,family-1, morphology-1) (**3 wt)**
8. Write the name and function of the tool ix) (**2 w**t.)

Specimen key

1 Material i) For budding
2 Material ii) For grafting
3 Material iii) For Layering (Air layering)
4 Material iv) For Hybridisation (crotalaria)
5 Material v) Pathology specimens mentioned in the syllabus
6 Material vi) herbarium from herbal science & vii) horticulture.
7.Any horticultural crop viii) in the syllabus
8. Any horticultural tool ix) in the syllabus

Internal assessment

Components	Weightage
Record	2
Attendnce	2
Practical test	2
Lab skill	2
Viva	2
Total	10

Open Courses

(Any of the six courses can be opted during the fifth and sixth semesters, keeping in mind that no courses are repeated during the sixth semester, according to which the course code may be

5D01BOT/**PLS**

OR

6D02BOT/**PLS**)

1. Horticulture
2. Mushroom cultivation and marketing
3. Environmental Science
4. Medicinal plants
5. Forestry
6. Biotechnology

Open Course

1.HORTICULTURE

COURSE CODE: **5D01**BOT/**PLS** OR **6D02**BOT/**PLS**

Contact Hours: 36

Credit-2

Module I **10 Hrs**

History, Scope and divisions of Horticulture, garden tools and implements

Methods of vegetative propagation-cutting, layering and grafting.

Propagation by specialized stem and roots- bulbs, corms, tubers, rhizomes and pseudo bulbs.

Media for propagation of nursery plants- characteristics of media- common media for propagation- soil, sand, peat, sphagnum moss, vermiculite. Soil mixture and nursery beds.

Manures: Organic and inorganic; Irrigation methods.

Module II **8 Hrs**

Important ornamentals-habit and types

Types of gardens-Indoor garden, Kitchen garden and public garden

Garden components- lawn making, glass house, rockery, water garden and topiary.

Landscaping- Principles of landscaping designs, components of landscape designs, lawn grass varieties, Arboriculture and role of trees in landscaping.

Module III **10 Hrs**

Olericulture- Definition- Importance of vegetables- Production technology- Cultivation, harvesting and storage of vegetables- Bhindi, Brijal, Bitter gourd, Snakegourd, Cucumber, Pumpkin, Colocasia, Tapioca and Tomato.

Pomology- Definition and Importance-Cultivation, harvesting and storage of fruits- Banana, Pineapple and mango. Sapota, apple, orange & jackfruit.

Growth regulators in horticulture. Plant protection measures for horticultural crops.

Module IV **6 Hrs**

Floriculture- Definition and Importance- Cultivation, harvesting and storage of flowers- Jasmine, Rose, Chrysanthemum, Gladiolus, Aster, Orchids and Anthurium.

Cultivation of plantation crops- Cardamom, Coffee, Tea, Coconut Arecanut, Rubber and Cashew.

Module V **2 Hrs**

Preservation of fruits and vegetables; Cut flowers- Flower arrangement and Bonsai.

PRACTICALS

1. Demonstration of vegetative methods of propagation
2. Flower arrangement with cut flowers.
3. Preparation of potting mixture of known combination
4. Visit to a well established nursery.

REFERENCES

1. Bhattacharjee, S.K. 2006. Advances in Ornamental horticulture. Pointer Publications, Jaipur.
2. Bose, T. K, J. Kabir, P. Das and P.P. Joy. 2001. Tropical Horticulture. Naya Prakash Publications, Calcutta.
3. Chaha, K.L. 2001. Handbook of horticulture. ICAR, New Delhi.
4. Desh Beer Singh and Poonam Wazir. 2002. Bonsai- an Art. Scientific Publishers, Jodhpur.
5. Edwin Biles. 2003. The Complete book of gardening. Biotech book, New Delhi
6. Kumar, N. 1999. An introduction to horticulture. Rajalakshmi Publication, Nagarcoil.
7. Sharma, V.K. 2004. Advances in Horticulture: Strategies, production, plant protection and value addition- Deep and Deep publications, New Delhi.
8. Singh, S.P. 1999. Advances in Horticulture and Forestry. Scientific publishers, Jodhpur.

Open Course

2. MUSHROOM CULTIVATION AND MARKETING

Course code -5D01BOT/PLS OR **6D02BOT/PLS**
Contact Hours- 36
Credit- 2

Module I
History and introduction. Edible mushrooms and Poisonous mushrooms. Systematic position, morphology, distribution, structure and life cycle of *Agaricus* and *Pleurotus.*
8 Hours

Module II
Nutritional value, medicinal value and advantages- types- milky, straw, button and poisonous mushrooms **6** Hours

Module III
Cultivation: Paddy straw mushroom – substrate, spawn making. Methods – bed method, polythene bag method, field cultivation. Oyster mushroom cultivation –Substrate, spawning, pre-treatment of substrate. Maintenance of mushroom. Cultivation of white button mushroom – Spawn, composting, spawning, harvesting. **10** Hours

Module IV
Diseases- Common pests, disease prevention and control measures. Processing - Blanching, steeping, sun drying, canning, pickling, freeze drying. Storage – short term and long tem storage. **6** Hours

Module V
Common Indian mushrooms. Production level, economic return, Foreign exchange from Mushroom cultivating countries and international trade. **6** Hours

PRACTICALS
1. Practical method of mushroom cultivation.

REFERENCES

1. Anonymous, **Indian Journal of Mushrooms.** Published by I.M.G.A. Mushroom Research Laboratory. College Agriculture, Solan
2. Gupta P.K. Elements of Biotechnology.
3. Harander Singh. 1991. Mushrooms- The Art of Cultivation- Sterling Publishers.
4. Kaul T N 2001. Biology and conservation of mushrooms. Oxford and IBH publishing company N.Delhi
5. Pandey B P 1996. A textbook of fungi. Chand and company N Delhi.

Open Course

3.ENVIRONMENTAL SCIENCE

Course Code: **5D01**BOT/**PLS** OR **6D02**BOT/**PLS**

No. of credits- 2

No. of contact hours- 36

Aim of the Course:

The dynamic nature of biosphere, interrelationships among individuals etc. can impart need for conservation in students.

Objectives:

1. To enable the students to understand the fundamentals of environmental science
2. To enable them to contribute meaningfully in the conservation of the environ ment'.
3. To make them aware of the current global problems of the environment due to human itervention.and the need of developing a sustainable way of life
4. To appreciate bio diversity and the importance of conservation strategies.
5. To make them aware of the global ecological crisis.

Module-1-Ecosystem **10hrs**

Introduction-Basic principles and concepts of ecology and environment- Interdisciplinary approach- Scope and relevance to society and human environment. Need for public awareness.- Ecosystem–Definition, ecosystems-concept of an ecosystem – structure and function of an ecosystem. a) Abiotic factors : Climate shapes the character of ecosystem. - Edaphic factors- b)Biotic factors- .Kinds of ecosystem. human activity is placing the biosphere under increasing stress- Dynamics of Ecosystem Energy flow in an ecosystem , food chain.-Food web and ecological pyramids.Biogeochemical cycle: Gaseous-Carbon ,Oxygen & Nitrogen. Hydrological- Water-EcologicalSuccession- definition, types, causes of succession, process of succession. Hydrosere and Lithosere .Ecological adaptation of Hydrophytes, Xerophytes, Halophytes, epiphytes and parasites

Module2 **8hrs**

Natural resources-Renewable and non-renewable resources.Natural resources and associated problems.- Forest resources- deforestation, aforestation, -conservation-protection forestry-chipko movement-production-commercial forestry -socialforestry, Agroforestry - timber extraction, mining, dams and their effects on forest and tribal people-Mineral resources- Environmental effects of extracting and using mineral resources- Water resources-use and overuse of surface water and ground water- floods, droughts - Food resources –World food problems- Energy resources : Growing energy needs, renewable and non-renewable resources-use of alternate energy sources- Land resources : Land

as a resource, land degradation , man- induced land slides, soil erosion and desertification- Equitable use of resources for sustainable life styles.

Module 3- Social issues and the environment 13hrs

Environmental pollution a)Definition, causes-effects and control measures. Types ofpollution -Air, Water, Solid wastes-management-, radioactive, noise & thermal pollution.- Role of an individual in prevention of pollution. Pollution case studies. Roleofpollution control board.- From unsustainable to sustainable development. Urbanproblems related to energy. Water conservation- Rain water harvesting and water shed management. Resettlement and rehabilitation of people- its problems and concerns - Environmental ethics: issues and possible solutions - Climate change and Global warming, acid rain, ozone layer depletion, nuclear accidents-Wasteland reclamation, Issues involved in enforcement of environmental legislation-.Public awareness-Human population and environment-Population growth, variation among nations. Population explosion-Familywelfare program. Environment and human health: Human rights - The Ecological crisis-industrialisation-the human transformation of the earth- human activity is placing the biosphere under increasing stress.growth of the world economy-.urbanisation.-the vulnerable planet.World Earth summits and protocols-Rio,Kyoto.Johannesberg.The failure of ecological reforms-Enviornmental revolution.

Module 4-Biodiversity and its Conservation 5hrs

Biodiversity-Concepts of biodiversity -Types of biodiversity- biodiversity in India. India as mega diversity nation- hotspots of biodiversity ,threats to biodiversity-.Conservation of biodiversity-: The conservation strategies are multidimensional.. -National parks, wildlife sanctuaries.

REFERENCES

1. Agarwal K .C . – Envoronmental Biology – Nidi Pub:
2. Aggarwal, S. K., 2009. Foundation Course in Biology, 2nd edn., Ane Books Pvt. Ltd., New Delhi.
3. Ambasht R.S. & Ambasht N.K., A Text of Plant Ecology. Students' Edition, 1996, Friends &Co., Lanka, Varanasi – India.
4. Bharucha, E. 2005. Textbook of Environmental Studies for Undergraduate Courses. Universities Press (India) Private Limited, Hyderabad.
5. Clark R .S .Marine Pollution – Oxford
6. Jadhav H. Environmental Protection laws – Himalaya Pub:
7. Khitoliya, R. K. 2007. Environmental Pollution – Management and Control for Sustainable Development. S. Chand & Company Ltd., New Delhi.
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10. Kumar, H. D .– Modern concept of Ecology – Vikas Pub:
11. Kumaresan B. – Plant Ecology & Phytogeography – Rastrogi Pub:
12. Michael, S. 1996. Ecology. Oxford University Press, London.
13. Mishra, K C, Plant Ecology

14. Mishra. D. D. 2008. Fundamental Concepts in Environmental Studies. S. Chand & Company Ltd.,New Delhi.
15. Odum – Fundementals of Ecology – Prentice Hall
16. Odum, E. P. 1983. Basics of Ecology. Saunder's International Students Edition, Philadelphia.
17. Rao M .N . & Dutta A .K . Waste Water Management – Oxford &IBH
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19. Raven, PH; Johnson, GB; Losos, JB; Singer, SR (2005), Biology, seventh edition, Tata McGraw-Hill, New Delhi
20. Sharma P . D . Ecology and Environment – Rastrogi Pub:
21. Sharma, P. D. 1989. Elements of Ecology. Rastogi Publications, Meerut.
22. Singh, H. R. 2005. Environmental Biology. S. Chand & Company Ltd., New Delhi.
23. Trivedi R .K . – Hand book of Environmental laws – Enviro Media.
24. Trivedi R .K . Introduction to Air Pollution – Tecno- Science Pub:
25. Verma V. – Text book of Plant Ecology – Emkay Pub:
26. Verma, P. S. and V. K. Agrawal. 2004. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Company Ltd., New Delhi.
27. Wagner K. D . – Environmental management – W. B .Saunders Co:

Open Course-

4.MEDICINAL PLANTS

Course code- 5D01BOT/**PLS** OR **6D02**BOT/**PLS**
Contact Hours- 36
Credit - 2

Module I

Ethnobotany- definition- categories-major tribes of south India- regional studies- ethnomedicinal plants- wild food plants- socio-economic status. **8** Hours

Module II

Importance and conservation of medicinal plants – *Insitu, exsitu*, sacred groves. Role of ICAR, IMPB, BSI, NBPGR and FRLHT in conservation and cultivation of medicinal plants. IPR issues.

6 Hours

Module III

Pharmacognosy – definition and scope – ancient and modern science (*sidha, ayurveda unani and homeopathy*), Classification of vegetable drugs, identification of drugs (taxonomical, anatomical, and chemical). **8** Hours

Module IV

A general account of the methodology of cultivation of medicinal plants. Rhizome – *Curcuma,* Ginger; Tuber- *Allium cepa* ; Root – *Asparagus, Hemidesmis, Acorus calamus* ; Twigs- *Adhathoda vasica, Catharanthus roseus, Phyllanthus amarus, Andrographis paniculata* ; Leaves – *Aloe vera , Centella asiatica*. **8** Hours

Module V

Sources of vegetable drugs – biological, geographical and cultural. Production of vegetable drugs – Role of growth regulators. Deterioration of drugs and their control measures – Adulteration of drugs. **6** Hours

Practicals

1. Familiarize with at least 5 folk medicines and report the source cultivation and extraction.
2. Visit to an Ayurveda college or Arya Vaidya sala.
3. Identification of the medicinal plants in **module IV.**

REFERENCES

9. Anil K Dhiman.2003. Sacred Plants and their medicinal uses. Daya publishing house New Delhi.
10. Jain S K 1981. Glimpses of Indian ethnbotany. Oxford and IBH New Delhi.
11. Jain S K 1990. Contribution Indian ethnobotany. Scientific publishers Jodhpur
12. Jain S K.1996. Ethnobotany in human welfare. Deep publishers. New Delhi
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16. Verma V 2009. Text book of Economic Botany. Ane Book

Open Course

5.FORESTRY

Course Code- 5D01BOT/**PLS** OR **6D02**BOT/**PLS**
Contact Hours- 36
Credit - 2

Module I

General introduction to forests- Natural and Man made; Tropical, temperate, evergreen semi-evergreen, deciduous; Monoculture, multipurpose, social and industrial.
Forest and gene conservation. **5** Hours

Module II

Silviculture- concept and scope of study of natural and artificial regeneration of forests. Clear felling, uniform shelter, wood selection, coppice and conservation systems. Silviculture of some of the economically important species in India such as *Azadirachta indica, Tectona grandis, Eucalyptus,*Mahagoni *Dalbergia sisso* and *Santalum album,* jack wood, Rubber. **8** Hours

Wood: Homogenous and heterogenous- spring and autumn wood- Porous and non porous wood- Heart and sap wood. **2**Hours

Relevance of wood anatomical studies in Kerala- Identification of wood- preparation of key and their uses **3** Hours

Module III

Social and agro forestry. Selection of species and role of multipurpose trees. Food, fodder and energy. Social forest- Avenue plantation. Sacred plants- definition, importance of sacred trees like *Ficus religiosa, Emblica officinalis, Aegle marmelous*. **5** Hours

Module IV

Seed orchards, seed dormancy- Types of dormancy, physical and chemical methods to overcome seed dormancy. Forest laws- necessity, General principles, Indian forest act 1927 and their amendment. **5** Hours

Module V

Forest resources and utilization. Forest products- timber, pulp wood, secondary timbers, non timber forest products (NTFPs). Definition and scope (brief outline) - Gums, resins, fibers, oil seeds, nuts, rubber, canes and bamboos, medicinal plants, charcoal. Lac collection and marketing. **8** Hours

PRACTICALS

1. Identification of wood using key: Teak, Jack wood, Mahogany, Rubber, Azadirachta, Eucalyptus.
2. Visit to a plywood factory to have knowledge of wood based industry.

REFERENCES

1. Anil Kumar Dhiman. 2003. Sacred plants and their medicinal uses. Daya publishing house, New Delhi.

2. Anonymous, A Hand book of Kerala Timbers- KFRI, Trichur.
3. Chundawat B.S. and S.K.Gautham. 1996. Text book of Agroforestry. Oxford and IBH Publishing house, New Delhi.
4. Kollmann and Cote 1988. Wood science and Technology. Vol.I & II Springer verlag.
5. Sagreiya, K.P. 1994. Forests and Forestry (Revised by S.S. Negi). National book trust. New Delhi.
6. Sharma P.D. 2004. Ecology and Environment. Rastogi publications, Meerut
7. Singh M.P. and Vinita Vishwakarma. 1997. Forest environment nd Biodiversity. Daya publishing house, New Delhi.
8. Tiwari K.M. 1983. Social forestry in India.
9. Tribhawan Mehta, 1981. A handbook of forest utilization. Periodical Expert Book Agency, New Delhi.

Open course

6.BIOTECHNOLOGY

Course Code: 5D01BOT/**PLS** OR **6D02**BOT/**PLS**

No. of credits- 2
No. of contact hours- 36

Aim and objectieves

1. To know the fundamental techniques of biotechnology. and the history of its development.
2. To orient them to apply the technology in agriculture and other fields.
3To make them aware of the economic,. social and environmental problems of gene manipulation
4 To acquaint and train them in the use of the equipments in biotechnology
5To understand the application of bio technology and nanobiotechnology.

Module-1 -Recombinant DNA Technology- (15Hrs)

Recombinant DNA and Molecular cloning-Restriction Endonucleases-Ligases and other DNA modifying Enzymes(cutting,modifying and joining DNAmolecules)

Cloning vectors-Plasmids-Bacteriophages-PBR322,PUC, λphage- Ti and Ri Plasmids

Consruction of recombinant DNA-methods - Vector method.Agrobacterium mediated gene transfer-Direct DNA uptake-Electroporation-shot gun method-microinjection

Strategies of molecular cloning - Screening ,selection and analysisof recombinants, Molecular probes- Colony Hybridisation-insitu hybridization-southern.northern western blotting-RFLP-RAPD, -FISH- DNAand RNA Fingerprinting-Genomic Library-cDNA Library and Gene bank-DNA Sequencing method-Mapping and sequencing of human genome.-the human genome project and plant genome project.

Module-2- Recombinant DNA technology and society (7 hrs)

Bioechnology and Bio ethics – an overview of Genetic screening . Gene therapy-DNA fingerprinting,(Paternity and Forensics), GMOs, food safety- environmental concerns

GMOs-Genetic screening and privacy-Role of multi national companies – Agribusiness-Golden Rice- Terminator Genes. Economic, and Legal issues. Bio Ethics-Patenting Life forms . Biotechnology,Patents and the Third World. Stem cell research-sociopolitical issues. .HGP and ethical questions.

Module-3-Nano biotechnology (9Hrs)

Basics of Nanobiotechnology-Introduction- Background and definition of nanotechnology - nanosystems in nature- nano scaled bio molecules (nucleic acids and proteins) –chemical synthesis of artificial nanostructures-Technologies for visualization of biological structures at the Nanoscale- Atomic force microscope- magnetic resonance force microscopy-Nanoscale scanning electron microscope- Nanoparticles- - Applications of nanotechnology in life

sciences- Nano biotechnology and systems biology- nanobiology and the cell- biosensing of cellular responses.

Module-4 -Plant Tissue culture – **5 Hours**

Culture media; composition, preparation and sterilization – Totipotency:definition and importance . Synthetic seeds -Anther culture and production of haploids - protoplast culture – somatic hybrids –cybrids

.

References:

1. Balasubramanian, D et.al(1996) (Ed):*Concepts in Biotechnology*; Costed IBN Universities press.
2. Benjamin Lewin(2004) *Gene VIII*.Pearson Education international.
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4. Chawla.H.S(2003) *Laboratory Manual for plant Biotechnology*;oxzford and IBH
5. Colin Ratledge, Bjorn Kristian Sen, (eds.) 2006, *Basic Biotechnology*, 3rd edn. Cambridge University Press, New Delhi.
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15. Jain.K.K ( ) *Nanobiotechnology in molecular diagnosi*s- current technologies and applications.
16. Jan Vijg, 2007, *Aging of the genome- The dual role of DNA in life and Death,* Oxford University Press Inc.,
17. John .E.Smith(2004):*Biotechnology*:Cambridge university press.
18. Karp, G.(2008) *Cell and Molecular Biology: Concepts and Experiments*, John Wiley and Sons (Asia) Pte Ltd.
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20. Keshav Trehan (1990) *Biotechnology*.Wiley Eastern,New Delhi.
21. Laura Livingston Mays(1981):*Genetics A Molecular approach*: Macmillan publishing company.
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Sd/-
Dr.Kochuthressiamma Andrews,
Chairperson, BOS IN Botany(UG).

K A N N U R U N I V E R S I T Y

(Abstract)

B.Sc Plant Science Programme under CCSS- ***General Course 4A11PLS Entrepreneurship-Syllabus and Pattern of Question Papers*** -Implemented with effect from 2009 admission-Orders Issued.

ACADEMIC BRANCH

No.Acad/C2/2471/2007 Dated, K.U.Campus. P.O , 24- 04-2010.

Read: 1. U.O No.Acad/C2/2471/2007 (2) dated 08-07-2009.
2. Letter dated nil from the Chairperson, BOS in Botany (UG).

ORDER

1.The Scheme and Syllabus of B.Sc Plant Science Programme under CCSS (Core/General(except 4A11PLS)/Open Courses) were implemented in this University, with effect from 2009 admission as per paper read (1) above.

2. The Chairperson, BOS in Botany (UG) vide paper read (2),has forwarded the syllabus of 4A11PLS Entrepreneurship offered as General Course for IV Semester of B.Sc Plant Science Programme and Pattern of Question Papers, for implementation with effect from 2009 admission.

3. The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction ***to implement the syllabus of 4A11PLS 'Entrepreneurship' offered as General Course for IV Semester B.Sc Plant Science Programme under CCSS and Pattern of Question Papers with effect from 2009 admission***, subject to report to the Academic Council.

4. The U.O read above stands modified to this extent.

5. Orders are issued accordingly.

6. The syllabus of 4A11PLS 'Entrepreneurship' of Plant Science Programme and Pattern of Question Paper under Choice based Credit Semester System, implemented with effect from 2009 admission is appended.

Sd/-
To: REGISTRAR

1. The Principals of Colleges offering B.Sc Plant Science Programme.
2. The Examination Branch (through PA to CE)

Copy To:
1. The Chairman, BOS Botany (UG)
2. PS to VC/PA to PVC/PA to Regr
3. DR/AR I Academic
4. Central Library
5. SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

Appendix to U.O No Acad/C2/2471/2007 dated 24-04-2010.

B.Sc. Plant Science
GENERAL - 4

ENTREPRENEURSHIP

Course Code : 4A11PLS
No. of credits : 4
No. of contact hours : 90(54+36)

Aim and objectives

1) To establish relevance to emerging socio-economic environment and social prosperity;
2) To ensure equity of opportunity and participation
3) To instill and stimulate human urge for excellence.
4) To realize individual potential for generating goods and services by putting to use the inputs
5) Acquiring entrepreneurial spirit and be enterprising in all walks of life.
6) Familiarization with various uses of human resource for earning decent means of living.
7) Understanding the concept and process of entrepreneurship - its contribution and role in the growth and development of individual and the nation.
8) Acquiring entrepreneurial quality, competency and motivation
10 Learning the process and skills of creation and management of entrepreneurial venture.

Course Outline

Module-1: Concepts of Entrepreneurship-Entrepreneur-Meaning and definition-Characteristics- Functions-types of entrepreneurs-Entrepreneurial traits-Factors affecting entrepreneurial growth-Entrepreneurial Development programme- objectives and contents.

Module-2: Importance of Entrepreneurship for Economic development-Role in capital formation, Infrastructure development, Entrepreneurship and Environment-Need for rural Entrepreneurship-problems of rural Entrepreneurship-NGOs and rural entrepreneurship-Women entrepreneurship-need, scope and problems.

Module-3: Project formulation-meaning of project-phases of project management-Generation of project ideas-screening-project identification-Desk research and techno-Economic survey-elements of project formulation-Technique-Feasibility analysis-Techno-Economic Analysis-project design and Network analysis-input analysis-Financial analysis-Social cost benefit analysis-pre-investment analysis.

Module -4: Appraisal and evaluation of Bankable projects-Project Report and project appraisal-Meaning of project report- scope-contents of project report—profoma of project report-Meaning of project appraisal-scope-Feasibility studies-economical-organisational, Managerial, Technical, financial and Marketing Feasibility-Balancing of various factors.

Module -5: Introduction to Plant Science-related enterprises-
Ornamental nursery business and allied aspects:- Nursery preparation, landscaping, Floriculture, Bonsai production, Ornamental gardening & Flower arrangement- Medicinal plant unit with planting materials- Mushroom cultivation.
Planting Materials: - Tissue culture planting material production, Plant propagation techniques (grafting/Budding).
Crop Management/ Crop Protection/ Intercultural operations: - Biofertilizer (Azolla), Compost manure preparation, Biocontrol agents (Trichoderma).
Service aspects: - Plant Identification, Herbarium Preparation units, Preparation of classwork materials, permanent slide production and photomicrography. Service centre for Microscope and Microtome.
Value added Products: - Agri based handicrafts, Preservation of fruits and Vegetables.

Module-6: Govt. policy for small scale Entrepreneurs-Institutional support-Role of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and village Industries Commission (KVIC), Technical consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC),Small Industries DevelopmentBankofIndia(SIDBI),CommercialBanks, Entrepreneurship training institutes of North Kerala- RUDSETI(Rural Development and Self Employment Training Institute) and BIRED(Bellikkoth Institute of Rural Entrepreneurship Development).

Practicals

1. Visit to successful enterprises- agricultural, industrial and service organizations.
2. Experience sharing of Entrepreneurs
3. Analytical study on problems/constraints faced by entrepreneurs.
4. Discussion with policy makers/government officials related with Entrepreneurship development.
5. Model project preparation on selected enterprises.
6. Visit to NABARD/Lead Bank/RRBs/and interactive session on procedures and formalities of starting agri-business projects.

Text Books:

1. School of Distance Education, Mangattuparamba, Entrepreneurial Development and Business Decisions(II B.Com: Self Instructional Materials),Director,SDE, Kannur University. (Entrepreneurial Development).

REFERENCES

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30. Vasant Desai(2004), Dynamics of Entrepreneurial Development and management, Himalaya Publishing House, Mumbai.
31. Venkateswarlu, V., Morphology of Angiosperms, Chand & Co.
32. Zakria Baig, M(2000), Industrial Management and Entrepreneurship, Radiant Publishing House, Hyderabad.

KANNUR UNIVERSITY EXAMINATION

Plant Science -Theory Model Question Paper

Reg. No: Code:

GENERAL COURSE – 4

CODE- 4A11PLS - ENTREPRENEURSHIP

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) ---

a)…. b) …. c)….. d) …..

ii) ----

a) .. b) … c) …… d) ……

iii) ……

a)… b) …… c) …… …d) ……..

iv) ……..

a)……. . b)…… c) ……. d) ……..

2.Write 'true or false'.

i). ……..

ii) ……...

iii) ……

iv) …….

3.Fill in the blanks

i) ……. ---------

ii) …….. --------.

iii) …….. --------.

iv) ……. --------.

4 Match the following

A	B
i) …….	……
ii) ……..	……
iii) ……..	……
iv) ……..	……..

5. **Answer in one word or in one sentence**

i).Entrepreneur

ii). ……..

iii) ……

iv). ……...

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 ……
7. ……...
8. ……..
9. …….
10. ……..
11. …….

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. …….
13. ……..
14. ……...
15. ……
16. ……..
17. ……
18. …….

Section D

Answer any *Six*

(Short-essay questions; each question carries a weightage of 2)

19. …….
20. ……..
21.. ……
22. ……
23. …….
24. ……..
25. ……..
26……...

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. …….
28. …….
29. ……...

K A N N U R U N I V E R S I T Y
(Abstract)

B.Sc Botany/***Plant Science Programme***s under CCSS-***Model Question Papers for Core***/ Complementary/***General Courses***-Implemented with effect from 2009 admission-Orders issued.

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ACADEMIC BRANCH

U.O No.Acad/C2/2471/2007 Dated, K.U Campus P.O,17-07-2010.

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Read: 1.U.O No Acad/C2/2471/2007(1) dated 08-07-2009.
2.U.O No Acad/C2/2471/2007 dated 08-04-2010.
3. Letter dated nil from the Chairperson, Board of Studies in Botany (UG).

ORDER

1)The Scheme and Syllabus of B.Sc Botany/Plant Science Programmes(Core/ Complementary/General/Open Courses) and the Common pattern of Question Papers and Model Question Paper for II Semester Examinations of Botany Complementary Course were implemented in this University with effect from 2009 admission, vide paper read(1) &(2) above.

2) The Chairperson, Board of Studies in Botany (UG),vide paper read (3), has forwarded the Model Question Papers for the examinations of Core/Complementary/General Courses of B.Sc Botany/Plant Science Programmes under Choice based Credit Semester System for implementation with effect from 2009 admission.

3) The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction ***to implement the Model Question Papers for the following Core/***Complementary***/General Courses of B.Sc*** Botany***/Plant Science Programme*****s under CCSS, with effect from 2009 admission***, subject to report to the Academic Council.

i)3A06PLS-History and Philosophy of Science.
ii)4B03PLS-Herbal Science.
iii)4A11PLS-Entrepreneurship.
iv)3C03BOT- Angiosperms–Morphological Variations, Systematics, Utility of Plants and Plant Pathology.
v)4C04BOT- Plant Physiology, Angiosperm Anatomy and Crop Improvement.

4) The University Order read (1) &(2)stands modified to this extent.

5) Orders are issued accordingly.

6) The implemented Model Question Papers as detailed above are appended.

Sd/-
REGISTRAR

To:
The Principals of Colleges offering B.Sc Botany/Plant Science Programmes

Copy To:
1. The Examination Branch (through PA to CE)
2. The Chairperson, BOS in Botany (UG)
3. PS to VC/PA to PVC/PA to Regr
4. DR/AR I Academic 5. SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

Appendix to U.O No Acad/C2/2471/2007 dated 17-07-2010.

Plant Science -Theory Model Question Paper

Reg. No: Code:

GENERAL COURSE –2

CODE - 3A06PLS - HISTORY AND PHILOSOPHY OF SCIENCE

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer

i) Who among the following was NOT a contemporary of Newton?
a)Robert Hooke b) Leibniz c) Huygens d) Galileo

ii) The term 'Nanotechnology' refers to
a) extreme miniaturization b) operations involving one nanometer or less
c) operations in the scale of 100 nanometer or less d) anything which is done at molecular level

iii) Microorganisms could be observed under the magnifying glass and reasonable sketches produced by
a) Robert Hooke b) Hans Jansen c) Sakharias Jansen d) Leeuwenhoek

iv) Indian Scientist associated with germ theory
a) Pasteur b) Jenner c) Koch d) Ross

2. Write 'true or false'.

i) The complete human genome consists of about 3 billion genes.
ii) Aristotle was a brilliant biologist but a feeble physicist.
iii) Friedrich Miescher (1779-1840) discovered the presence of nucleic acids in the cell nuclei.
iv) Galen discovered the circulation of blood.

3. Fill in the blanks

i) Classical Indian Medical Knowledge is called ---------
ii) Agriculture was started about --------years ago.
iii) --------suggested that the sun was not the centre of the universe and that there were many worlds.
iv) The Chinese records of comets go back to the ---- century ----.

4. Match the following

A	B
i) Galileo Galelei	Lincolnshire
ii) Isaac Newton	Kerala
iii) Aryabhatta	Pisa
iv) Bruno	Martyr

5. Answer in one word or in one sentence

i) Inference

ii) Name the two great centres of learning during the Golden age of Indian Science.

iii) NIH

iv) Meaning of Ayurveda

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 History of Science and Philosophy of Science

7. Science and Non-science

8. Verification and Falsification

9. Methodology of Modern Science and Ancient Science

10. Chinese and Indian Traditional Systems of Medicine.

11. Deductive and Inductive Reasoning Methods

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. Trace how the 'germ theory' came to be generally accepted.

14. 'We have found the secret of life', Francis Crick is said to have exulted. How justified is this claim?

14. Outline the general approach of Ayurveda to the science of healing.

15. What do you mean by scientific truth?

16. Why do some philosophers insist that you can never prove anything by induction?

17. Who proposed the concept of "*Natural OntologicalAttitude"? Explain it.*

18. What are the three aspects of healing as in the Greek context? Distinguish between them.

Section D

Answer any *Six*

(Short-essay questions*;* each question carries a weightage of 2)

19. Write about the promise and perils of nanotechnology.

20. Why is Leonardo da Vinci depicted as personifying renaissance in Europe?

21. Trace the line of transmission of Indian numerals to Europe.

22. Discuss the relation between astronomy and agriculture.

23. What are the corroborative evidences for Darwin's Theory of Evolution, which modern science has added?

24. Explain science as a product and a process.

25. Genetically modified food: boon or bane?

26. Why does the beginning of agriculture mark a turning point in the progress of science?

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. 'Even though China was far ahead of Europe in Science and Technology, it is curious that the Industrial Revolution did not take place there'. Discuss the paradox and give possible explanations.

28. Science, as we know today, is a comparatively late product of civilization. Elucidate this statement in the context of the contributions of early civilizations.

29. Is the importance given to science in society overrated? Critically examine.

Plant Science -Theory Model Question Paper

Reg. No: Code:

CORE COURSE-3

CODE- 4B03PLS- HERBAL SCIENCE

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) Dioscorides was a --------- physician

a) Greek b) French c) German d) Latin American

ii) Herbal medicines have become popular in recent years, since it is believed that they are

a) sacred b) cheaper c) without side-effects d) none

iii) Tannins are used in medicine because of their …….property

a) diuretic b) astringent c) colouring d) none

iv) Katarvazha belongs to the family

a) Musaceae b) Zingiberaceae c) Liliaceae d) Cannaceae

2.Write 'true or false'.

i). Amukkaram belongs to the family Apocynaceae

ii) In India, the details of the desired patent is published for the information of all concerned,

18 months after the date of filing of the application.

iii) TRIPs is a part of GATT.

iv) All intellectual properties are patentable.

3.Fill in the blanks

i) In one sense, …….. …….were medical missionaries.

ii) Pharmacognosy is defined as the science of drugs of …….origin.

iii) The leaf of Thulsi contain ……oil.

iv) --------.is an ancient system of medicine, in which minerals and metals are used and being practised in southern states of India,

,

4 Match the following

A	B
i) Turmeric	fruit
ii) Ocimum	root
iii) Asparagus.	rhizome
iv) Amla	leaves

5. **Answer in one word or in one sentenc**

i).Homeopathy

ii).Vegetative propagation

iii) Herbal preparations

iv) CDRI.

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 Seed viability and Seed dormancy

7. Ayurveda and Sidda medicine
8 Alkaloids and Glycosides
9. AYUSH and NMPB
10. Medicine and Pharmacy
11 Traditional and modern medicine

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12 Write a short note about the cultivation of 'Sadavari'.
15. Explain various methods of grafting.
14. Write a note about herbal formulation of drugs
15. Explain the general properties of drug constituents.
16. Write a short note about budding.
17. Give an account of cultivation of Aloe.
18. Explain the medicinal use of '*Phyllanthus emblica*.

Section D

Answer any *Six*

(Short-essay questions*;* each question carries a weightage of 2)

19 Write a note about seed propagation.
20. Describe 'Plant Variety Protectin'
21Give an account of cultivation and medicinal properties of 'Thippali'.
22. Write an account of medicinal plants suitable for the cultivation in public gardens and waste lands.
23. With labeled diagrams explain various layering methods.
26. Write a short note about the drugs obtained from root, stem and leaves.
27. Explain 'Ethnomedicine'.
26. Give an account of the cultivation and medicinal properties of 'Turmeric'.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Explain various commercial aspects in herbal science.
28. Describe the cultivation and medicinal uses of any five medicinal plants you have studied.
29. Describe in detail the intellectual property rights and related aspects in connection with Herbal Science.

Plant Science -Theory Model Question Paper

Reg. No: Code:

GENERAL COURSE – 4

CODE- 4A11PLS - ENTREPRENEURSHIP

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) Entrepreneur is a person who is a/an
(a) contributor of capital (b) organiser (c)risk taker (d) introducing something new

ii) Who is an intrapreneur?
(a) who buys business (b) who sells business (c) executives who leaves an organization and starts his own business(d) none of the above

iii) Characteristic of an entrepreneur
(a)hardwork (b) desire for achievement (c) laziness (d) none of the above

iv) Who is an innovative entrepreneur?
(a)copying others (b) imitating others (c) not imitating (d) none of the above

2.Write 'true or false'.

i). Entrepreneurs are born; cannot be made.
ii) Drone entrepreneurs are suitable for a developing country like India.
iii) There is no role for entrepreneurs in developing a country.
iv) Entrepreneurs promote capital formation.

3.Fill in the blanks

i) An entrepreneur who is motivated by psychological and economic rewards is called . ……
ii) The meaning of the French word '*entreprendre*'is - --------.
iii) Most classical economists and the modern schools treat the entrepreneur as --------in the business world.
iv) STEP is the abbreviated form of ---------.

4 Match the following

A	B
i) induced entrepreneur	natural talents
ii) motivated entrepreneur	customer needs
iii) spontaneous entrepreneur	Govt. policies
iv) classical entrepreneur	Self fulfilment

5. Answer in one word or in one sentence

i). KITCO
ii). Enterprise.
iii) CPM
iv). PERT.

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 EDP and MDI.

7. Entrepreneurs and Managers

8. Biofertilizers and Biocontrol agents.
9. Appraisal and Evaluation.
10. Micropreparation and Photomicrography.
11. Fabian and Drone entrepreneurs.

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. Write short note on value added products in agribusiness.
13. What are the major problems involved in the conduct of EDP?
14. State the characteristics of a project.
15. Point out the skills required for an entrepreneur.
16. What are the main functions of SIDBI?
17. Explain the need for project formulation?
18. Write about the service aspects of plant science-related enterprises.

Section D

Answer any *Six*

(Short-essay questions; each question carries a weightage of 2

19. What are the problems faced by woman entrepreneurs?
20. The greatest problem of a woman entrepreneur is that she is a woman. Discuss.
21. What is meant by entrepreneurial motivation?
22. Write an explanatory note on 'Kakinada Experiment'on achievement motivation..
23. What are the objectives of EDP?
24..Define a small scale industry. What are its chief characteristics?
25. Explain various tax benefits available to small scale industries in India?
26. Discuss the various institutional support provided for small scale entrepreneurs.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Discuss the methods of project appraisal used to appraise a proposed project?
28. What is the need for, and significance of, the preparation of a project report for a small scale enterprise? Explain with, ornamental nursery business, as an example.
29. What are the problems of small scale industries? How can we tackle these problems?

K A N N U R U N I V E R S I T Y

(Abstract)

B.Sc Botany/***Plant Science Programme***s under CCSS- ***Model Question Papers-Core (Elective) and Open Courses along with modifications in the Model Question Papers of Core Courses***-Implemented with effect from 2009 admission-Orders issued.

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ACADEMIC BRANCH

U.O No.Acad/C2/2471/2007 Dated, K.U Campus P.O,14-09-2010.

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Read: 1.U.O No Acad/C2/2471/2007(1) dated 08-07-2009.
2. U.O No Acad/C2/2471/2007 dated 08-04-2010.
3. U.O No Acad/C2/2471/2007 dated 17-07-2010.
4. Letters dated nil from the Chairperson, Board of Studies in Botany (UG).

ORDER

1) The Scheme and Syllabus of B.Sc Botany/Plant Science Programmes (Core/Complementary/ General/Open Courses),the Common pattern of Question Papers along with Model Question Paper for II Semester Examinations of Botany Complementary Courses and that of the rest of the Core/Complementary/General Courses under Choice based Credit Semester System were implemented in this University with effect from 2009 admission, vide paper read(1),(2)& (3) above.

2) The Chairperson, Board of Studies in Botany (UG), vide papers read (4), has forwarded the Model Question Papers for B.Sc Botany/Plant Science Examinations of Core (Elective) & Open Courses along with certain modifications in some of the Model Question Papers of Core Courses by deleting question No.2 in Section A, to make it in tune with the common pattern as per paper read (2) above, for implementation with effect from 2009 admission.

3) The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction ***to implement the Model Question Papers for the Core (Elective) and Open Courses along with modifications in the Model Question Papers 4B04,5B05,5B06,5B07,6B13 & 6B14 of B.Sc*** Botany***/Plant Science Programme***s ***under CCSS, with effect from 2009 admission***, subject to report to the Academic Council.

4) The University Orders read above stand modified to this extent.

5) Orders are issued accordingly.

6) The implemented Model Question Papers as detailed above are appended.

Sd/-
REGISTRAR

To:
The Principals of Colleges offering B.Sc Botany/Plant Science Programmes

Copy To:
1. The Examination Branch (through PA to CE)
2. The Chairperson, BOS in Botany (UG)
3. PS to VC/PA to PVC/PA to Regr
4. DR/AR I Academic 5. SF/DF/FC.

Forwarded/By Order

SECTION OFFICER

Appendix to U.O No Acad/C2/2471/2007 dated 14-09-2010.

Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION
Botany/**Plant Science -Theory Model Question Paper**

CORE-4
4B04PLS/BOT- **THE ORIGIN OF LIVING THINGS- BIOMOLECULES AND CELL BIOLOGY**

Time: 3 Hours **Total Weightage: 30**

Section - A
Answer ***All***
(Questions in bunches of four; each bunch carries a weightage of 1)

1. Choose the correct answer

i) Which of the following shows the correct hierarchy in the molecular organization of cells
a) Metabolic inter mediates-Building blocks-Macro molecules-Supra molecular assemblies
b) Organelles--Building blocks- Macro molecules-Precursors from the environment
c) Precursors from the environment- Metabolic inter mediates-- Macro molecules-Building blocks
d) Building blocks- Macro molecules-Precursors from the environment-Supra molecular assemblies

ii) No cell is known to be without
a) Mitochondria b) Chloroplast c) A well defined nucleus d) Ribosome

iii) The size of Mitochondria is
a) 5 - 20μ, b) 50 -100 μ c) 0.5 – 1.0 μ d) 150-300 μ

iv) Which structure alone cannot be observed with light microscopy?
a) Vacuole b) Microfilament c) Cell wall d) Plastid

2. State true or false

i) Klinefilters syndrome is due to the addition of one extra chromosome to the normal cell.
ii) Sucrose is not a reducing sugar
iii) Cellulose and amylase are made up of glucose monomers
iv) Ribosome is a non-membrane organelle:

3. **Fill in the blanks**

i) The number of chromosomes in Drosophila melanogaster is ---------
ii) When there are 2n+2 chromosome in a cell, the condition is known as ----------
iii) Bond angle of H-O-H is ----
iv) The glycosidic bond involved in the branch point of amylopectin is…..

4. Select from column B to match column A and C

	A	B	C
i)	polysaccharide	carbon, hydrogen, oxygen	nucleotide
		as enzymes, hormones, pigments	
ii)	fat	carbon, hydrogen, oxygen, nitrogen, phosphorous	amino acid

		directs protein synthesis	
iii)	protein	carbon, hydrogen, oxygen in a 1:2:1 format	glucose
		immediate source of chemical energy	
iv)	nucleic acid	hydrogen, oxygen, carbon, nitrogen,occasionally sulfur	glycerol
		comprise parts of membranes, reserve source of chemical energy	

5. Answer in one word or in one sentence

i) Atmosphere of early earth
ii) The cytoskeleton of a cell.
iii) Phosholipid.
iv) Most diverse molecule in the cell

Section B

Distinguish between (any four; Each question carries a weightage of 1)

6 NAD and FAD
7 Reducing and Non reducing sugar
8 Sphingo lipids and phospho lipids
9 Paracentric and pericentric inversion
10 Primary and secondary cell walls.
11 Eukaryotic and prokaryotic cell.

Section C

(Short answer questions. Answer any Five; each question carries a weightage of 1)

12. Describe the general structure of a nucleotide
13.What are terpenes chemically, and how are they synthesized? Give one example each of mono- and triterpenes that serve as feeding deterrents to insects.
14. Classify aminoacids based on polarity
15. Living things are composed of lifeless molecules.But they show extra ordinary attributes not shown
by inanimate matter. comment on the molecular logic of the living state.
16. For a species with a diploid number of 18, indicate how many chromosomes will be present in the
somatic nuclei of individuals who are haploid, triploid, tetraploid, trisomic and monosomic
17. What are the basic points of A.I. Oparin's idea concerning the origin of the Universe/Solar System?
18. Give an account of the organisation of interphase nucleus

Section D

Short answer questions. Answer any Six; each question carries a weightage of 2.

19. Compare and contrast the particulars of the early earth and the current earth with respect to the types of molecules that were prevalent, Why is early earth sometimes described as a "nitrogenous or primodial soup. List two experiments to show that life could have originated from inorganic components
20. Draw the metaphase and anaphase stages of mitosis of a species with the data given below.2n= 6, in which one pair of chromosome is metacentric, one pair telocentric and one

pair submetacentric. The A,B and C loci each segregating a dominant and recessive allele(A and a, B and b, C and c) are each located on different chromosome pairs.

21. Draw a diagram of a higher plant chloroplast labeling the inner and outer envelope membranes, the thylakoid membranes, the stroma and the grana stacks. Indicate which membranes contain proteins of the photosynthetic electron transport chain and proteins associated with ATP synthesis.

22. Explain the morphology and chemical organization of chromosome.

23. Mitosis is the mere seperation of an already duplicated cell. Evaluate the statement.

24. Discuss the main functions of secondary metabolites in plants and relate these functions to the sites of accumulation of secondary compounds in the plant.

25. Draw and label a diagram of a biological membrane which illustrates the fluid mosaic model of membrane structure. Clearly indicate the phospholipids, the hydrophilic head groups, the lipophilic tails, intrinsic proteins, extrinsic proteins, attached carbohydrate moieties .

26. Describe the structure and functions of ribosome. Compare the components of ribosome in prokaryotes and Eukaryotes.

Section E

(Essay type question. Answer any one; each question carries a weightage of 4)

27. Distinguish between the primary ,secondary and tertiary structure of protein . Discuss the role of bonds in stabilising protein structure

28. Outline the ultrastructure of cell wall.How can you distinguish between the major components of plant cell walls: cellulose microfibrils, pectins, and hemicelluloses? Give examples of the types of molecules that make up each of these major structural components, and how they are arranged in the cell wall. Cite three distinct functions of plant cell walls

29. Give an account of the origin and evolution of biomolecules, cells and the early life

Code: Reg. No:

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KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

CORE – 5

5B05BOT/**PLS- ENERGY AND INTERMEDIARY METABOLISM**

Time: 3 Hours **Weightage: 30**

Section A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the Correct Answer

i) The conversion of pyruvate to oxalo acetate is likely to require which of the following co-enzymes?

a) Biotin b) Vit B12 c) Thiamine pyrophosphate d) Pyridoxal phosphate

ii) Redox potential value (E_0) of NAD/NADH system is

a) -0.1V b) +0.1V c**)** -0.32V d) +0.32V

iii) Which of the following is not a component of mitochondrial electron transport?

a) Ubiquinone b) Cytochrome b_6 c) Cytochrome c d) cytochrome a_3

iv) In photosynthesis, dark reaction or Blackman's reaction is

a) Enzymatic and occur in the absence of light

b) Non Enzymatic and occur in the absence of light

c) Enzymatic and independent of light

d) Enzymatic and occur in the presence of light

2. **State true or false**

i) The synthesis of glucose from lactate or glycerol is called glycolysis

ii) Phaeophytin is a chlorophyll in which central Mg atom is replaced by hydrogen

iii) Assimilation of nitrogen by plants is exclusively by ammonia.

iv) Light reaction takes place during day time and dark reaction in night

3 **Fill in the blanks**

i) Photorespiration is otherwise called as c2 cycle because----------

ii) RUBISCO is---------

iii) Initial acceptor of carbon dioxide in CAM cycle is-------

iv) The glycosidic bond involved in the branch point of amylopectin is-

4. The following are Nobel prize winners in photosynthetic research .Rearrange column B and C to match column A.

i)	Total synthesis of chlorophyll	Melvin Calvin	1978
ii)	Elucidation of enzymatic mechanism underlying the synthesis of adenosine triphosphate (ATP).	Paul D. Boyer and John E. Walker	1965
iii)	Oxidative and photosynthetic phosphorylation: chemi-osmotic theory	Robert Burns Woodward	1997
iv)	Carbon-di oxide assimilation in photosynthesis	Peter Mitchell.	1961

5. Answer in one word or in one sentence

i) The oxidation of a molecule of palmitic acid.
ii)The Km Value of an enzyme
iii)Co enzymes
iv) The emission of phosphorescent radiation

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Photophosphorylation and Oxidative Phosphorylation
7. Light reaction and Dark reaction.
8. Reductive amination and Transamination
9. Symbiotic and asymbiotic nitrogen fixation
10. Rate of photosynthesis in intermittent light and continuous light.
11. Competitive and non competitive inhibitors.

Section C

(Short answer questions. Answer any *five;* each question carries a weightage of 1)

12. What are terpenes chemically, and how are they synthesized? Give one example each of mono- and triterpenes that serve as feeding deterrents to insects.
13. Trace out the pathway by which Calvin explored the path of carbon in photosynthesis.
14. Comment on the amphibolic nature of citric acid cycle.
15. The net equation for oxidative phosphorylation can be written as

$$2NADH + 2H^+ + O_2 \longrightarrow 2H_2O + 2NAD$$

Write an analogous equation for the light reactions of photosynthesis .
16. Write on the role of ATP in biological reactions.
17. What is GS/GOGAT pathway?
18. Write a note on the regulation of citric acid cycle

Section D

Short answer questions. Answer any *six; e*ach question carries a weightage of 2.

19. Sachs found that the leaves lose more weight during night when they are attached to the plant than they are excised. Why?
20. What is β oxidation? Elucidate β oxidation of fatty acid.
21. What is an action spectrum? What is the relationship between the action spectrum for photosynthesis and the absorption spectrum of chlorophyll?
22.Discuss the main functions of secondary metabolites in plants and relate these functions to the sites of accumulation of secondary compounds in the plant
23.Summarise chemi osmotic coupling theory.
24. What is phosphorescence? Trace the Photochemistry and transfer of excitation energy in photosynthesis.
25.Explain the biochemistry of nitrogen fixation.
26.Give an account of the carbon dioxide fixation in succulent species.

Section E

(**Essay type question. Answer any one; each question carries a weightage of 4)**

27. Explain the process of root nodule formation in leguminous plants infected by Rhizobium. Give a detail account of the biochemistry of nitrogen fixation.
28. Describe the different steps whereby a molecule of glucose is oxidized to CO_2 in glycolysis and the citric acid cycle. In what steps is CO_2 released, and in what steps is energy conserved?
29. Give a detailed account of enzyme classification

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KANNUR UNIVERSITY EXAMINATION

Theory Model Question Paper

Core-6-

5B06 PLS/ BOT **- GENETICS AND MOLECULAR BIOLOGY**

Time: 3 Hours **Total Weightage: 30**

Draw diagrams wherever necessary

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct Answer

i) Which of the following statements defines a gene most precisely?
a)A gene is a fragment of DNA that codes for the production of a phenotypic trait

b) A gene is a fragment of DNA that codes for the production of a polypeptide or polynucleotide

c) A gene is a fragment of DNA that codes for the production of a protein.
d) A gene is a fragment of DNA that comprises a unit of inheritance

ii) A man who is affected with phenylketonuria marries a woman who is heterozygous at that locus. What is the probability that their first child will have phenylketonuria?
(a)1/8 (b)1/4 (c)1/2 (d)3/4

iii) The first event in the translation is the binding of the mRNA leader to the
a)Smaller ribosomal subunit b) Larger ribosomal subunit
c) Polysomal core d) tRNA

iv) Which is the correct sequence according to the increasing molecular weight?
a) tRNA→ DNA→ rRNA b) rRNA→ DNA→ tRNA
c) DNA→ rRNA→ tRNA d) tRNA→ rRNA→ DNA

2. State true or false

v) Semi conservative mode of replication of DNA was proved by Watson and Crick
vi) RNA polymerase and DNA polymerase are required for DNA replication
vii) Sister chromatids separate and segregate to opposite poles duringMeiosis-1
viii) Maize has 10 pairs of chromosomes. Linkage group present in it are 20

3. Fill in the blanks

i) An intercalating dye used to detect nucleic acid when viewed under uv light is--------
ii) The term to define gene as a unit of genetic function, a region of DNA which encode a specific product is known as--------
iii) The molecule which bears the anticodon is ……
iv) Y-linked genes are otherwise called ----------

4. Rearrange column B and C to match column A

i)	Co-linearity of genes and enzymes	Barbara Mclintock	1877
		George Beadle	
ii)	Genes	T.H.Morgan	1911
		Gregor Mendel	
iii)	Linkage	Yanofsky	1937
		H.G.Khorana	
iv)	Crossing over	Johannsen	1967
		Griffith	

5. Answer in one word or in one sentence

i) What would be the frequency of AABB individuals from a mating of two AaBb individuals?
ii) The events that occur during the first division of meiosis:
iii) Heritability
iv) In a collection of gametes from a heterozygote (AaBb), 10 out of 50 are recombinant for the a and b genes. How far apart are genes a and b?

Section B

. **Distinguish between any four of the following: (Each carries a weightage of 1)**

6. hn RNA and mRNA
7. Wobble hypothesis and Degeneracy of the genetic code
8. Transposons and retrotransposons
9. promoter and termination codon
10. photo reactivation and excision repair
11. Replication and Transcription

Section C

(Short answer questions. Answer any *Five;* each question carries a weightage of 1)

12. UV light causes thiamine dimerisation. Describe the mechanism, in order of efficiency that can repair the damage. Name the enzymes involved?
13. Determine the sequence of both strands of DNA from which the RNA shown belo was transcribed. Indicate the 5′ and 3′ ends of the DNA with an arrow and show which strand was transcribed?

5′ CCAUCAUGACAGACCCUUGCUAACGCA3′

14. A double stranded DNA molecule is 30% adenosine (A)
a) what is the complete base composition of this molecule?
b)Answer the same question ,but assume the molecule is double stranded RNA
15.In the ABO blood system in human beings ,alleles I^A and I^B are co dominant and both are dominant to the I allele . In a paternity dispute, a type AB woman claimed that one of four

men, each with different blood types, was the father of her type A child. .Which of the following could be the blood type of the father of the child on the basis of the father of the evidence given?

a) Type A b) Type AB c) Type O d) Type B

16. Explain why linkage is a violation of Mendels law of independent assortment of genes

17. List all enzymes that participate in the transcriptionand translation process

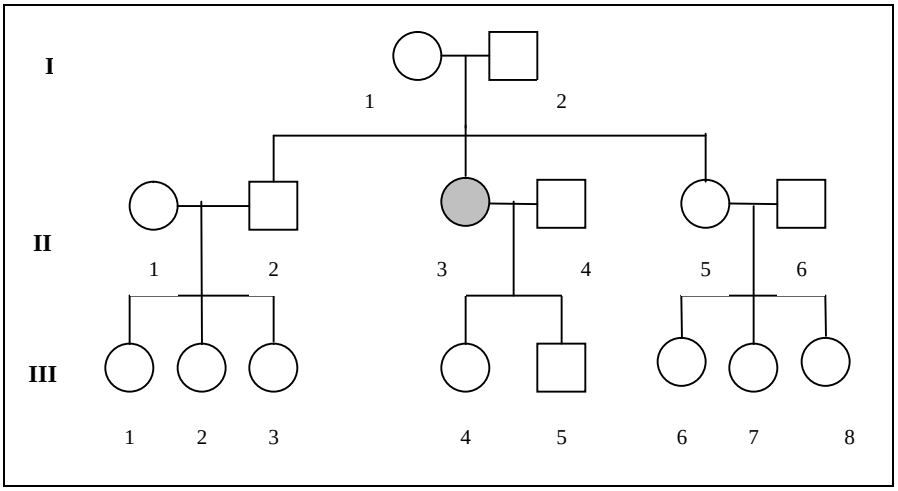
18. Draw the tautomeric formof adenine and cytosine

Section D

Short answer questions. Answer any*Six; e*ach question carries a weightage of 2.

19. In the following pedigree chart what is the probability of the following persons are of genotypeAa?

1 111-6
2 111-4
3 111-8



20. Can two mulatoes have white skinned offspring? Can two white skinned people have dark skinned offspring? Explain.

21. In Drosophila, crosses of Dichaete winged fliesXDichaete always give two thirds Dichaete to one third normal winged offspring. DichaeteX normal gives one half Dichaete and one half normal. How would you explain these results?

22.Assume that the difference between a type of wheat yielding about 4gm plant and one yielding 10 is due to three equal and cumulative multiple factor pairs, AABBCC, cross one type with the other. What will be the phenotype of the F1; of the F_2?

23.Diagram the relationships of the three types of RNA at a ribosome. Which relationships make use of complimentarity?

24. In the following problems on blood groups determine the genotypes of the parents?

a) One parent is groupA and the other groupB, but all four groups are represented among children.

b) Both parents are groupA, but three fourths of the children belong to groupA and one fourth to groupB

c) One parent is AB and the otherB, but of the children one fourthA,one fourthAB and one half B

25. Contrast the need for the enzymes involved in the metabolism of lactose and tryptophan in bacteria in the presence and absence of lactose and tryptophan respectively.

26. List the ways in which the behavior of chromosomes during meiosis correlates with the behaviour of genes during gamete formation

Section E

(**Essay type question. Answer any one; each question carries a weightage of 4)**

27. Summarize the central dogma of molecular biology and explain how mutation in DNA can alter a protein.

28 How can you distinguish extra chromosomal inheritance from a case of autosomal inheritance and sex linked inheritance? Explain.

29 Briefly analyse the important advance in gene theory contributed by each of these groups: Mendelian geneticists, cytogeneticists, one gene one enzyme groups, The DNA structure and replication investigators and the analysers of gene regulation.

Code: Reg. No:
Name :

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **– Theory Model Question Paper**

CORE – 7

5B07PLS/ BOT **- EVOLUTION, PALAEONTOLOGY AND PLANT BREEDING**

Time: 3 Hours **Total Weightage:30**

Section A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer.

i) Working from deep geologic strata toward shallow geologic strata, what is the sequence in which fossils of these groups should make their first appearance?

1. charophyceans
2. single-celled green algae
3. bryophytes
4. plants with a dominant sporophyte

a) 3, 1, 2, 4 b) 2, 4, 1, 3 c) 2, 1, 3, 4 d) 1, 3, 2, 4

ii) The following genotypes are found in a population:

BB Bb bb
70 50 20

What are the allele frequencies of B and b?

a). B = 0.86 and b = 0.14 b) B = 0.68 and b = 0.32
c). B = 0.63 and b = 0.36 d). B= 0.32 and b = 0.68

iii) Which concept was not included in Charles Darwin's theory of natural selection?

a) survival of the fittest b)struggle for existence

c) overproduction of offspring d)punctuated equilibrium

iv) Which of the following gases was not prevalent in abundance in the atmosphere of early earth, but became more prevalent after living organisms (mostly phototrophs) evolved? _

a) oxygen b) nitrogen c) methane d) ammonia

2. State true or false.

i) The theory that evolutionary change is slow and continuous is known as punctuated equilibrium.

ii).large population size, random mating, no selection, no migration, no mutation are the assumptions of Hardy Weinberg equilibrium.

iii) Variation within a pureline is heritable.

iv) Angiosperms are formed during cretaceous period.

3. Fill in the blanks

i) ---------- is considered as the father of paleobotany.

ii) The theory of chemical origin of life proposed by …….

iii) Fossils of leaves are known as ……

iv) Polyploidy brings about ……. Speciation.

4. Rearrange column B and C to match A

A	B	C
coenozoic	moss	$4500x10^6$
mesozoic	algae	$370x10^6$
palaeozoic	conifers	$190x10^6$
pre-cambrian	Angiosperms	$11x10^6$

5. Answer in one word or in one sentence

i)Heterosis

ii) Radiocarbon dating

iii) Genetic drift

iv) Coenozoic

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Progressive and Retrogressive evolution
7. Broad and narrow heritability
8. Micro and macro evolution
9. Isogenic lines and Purelines
10. Darwinism and Neo Darwinism
11. Polyploidy breeding and mutation breeding

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12 What is the evidence that life has evolved?

13. What are the major mass extinctions, and what are their presumed causes?What is the evidence that extinctions have created opportunities for the survivors?

14. In what ways to phyletic gradualism and punctuated equilibrium differ? Is there evidence for either or both of these models of morphological evolution? What could cause a pattern consistent with punctuated equilibrium?

15. How is radiometric dating performed to determine the age of rocks? How can this method be used to estimate the age of fossils?

16. Briefly describe the bulk method of breeding and its application.

17. Give a brief account on functional genomics

18 A.I. Oparin is credited with formulating the modern concept on the origin of life. His theory has subsequently been substantiated by scientists Stanley Miller and Sidney Fox.

What are the main points in Oparin's theory?

Section D

Answer any ***Six***

(Short-essay questions; Each question carries a weightage of 2)

19. What is genetic drift? What is its cause, and how does it affect populations? What are the consequences of genetic drift? What conditions increase the strength of genetic drift? How is an allele's frequency related to the probability of fixation of that allele?

20. Discuss the role of Allopolyploidy in Plant breeding.

21. What were the major evolutionary events of the Precambrian, Cambrian, Ordovician to Devonian, Carboniferous and Permian, Mesozoic, and Cenozoic. When did the Paleozoic begin and end (and with what periods?), when did the Mesozoic end (and with what period?). What was significant about the end of the Paleozoic and Mesozoic?

22. What are the various forms of nonrandom mating? What are their effects on genetic variation in populations? How do positive assortative mating and inbreeding differ? What are the negative consequences of inbreeding?

23. In what ways can speciation occur in the absence of geographic isolation? Why is speciation via hybridization so fast?

24. Differentiate lepidodendron and lepidocarpon

25. What kinds of observations during the voyage of the Beagle led Darwin to the theory of evolution via natural selection

26. Discuss the scope of hybrid varieties in self pollinated crops.

Section E

Answer any **One**

(Essay- type questions; Each question carries a weightage of 4)

27. What is speciation? Outline allopatric, parapatric and Sympatric speciations. In what way are the various evolutionary forces thought to be involved in the different models of speciation? What kind of evidence supports these models?

28. What is a fossil? What conditions increase the likelihood of fossilization?Briefly describe the method of calculating the age of the fossil. Describe the different types of fossils you have studied.

29. Give a detailed account of origin and evolution of plants

Code ***KANNUR UNIVERSITY EXAMINATION***

Name: Reg. No:

B.Sc. Botany/**Plant Science- Theory Model Question Paper**

CORE-13

6B13 BOT/**PLS - PLANT FORM AND FUNCTION-2- PLANT PHYSIOLOGY**

Time: 3 Hours **Total Weightage: 30**

Section A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer

i) Which of the following GA is immediate precursor of all other GA's in plants
a) GA_1 b) GA_2 c)GA_{10} d)GA_{12}

ii) Which of the following elements is essential for the synthesis of chlorophyll?
a) Calcium b) Potassium c) Manganese d) Manganese

iii) A plant, by opening and closing its stomata, must achieve a balance between
a) Oxygen loss and water uptake b) Carbon dioxide loss and sugar uptake
c) Water loss and carbon dioxide uptake d) Sugar loss and oxygen uptake

iv) Which of the following is not a specific physiological effect of gibberellin?
a) Elongation of internodes b) Bolting and flowering
c) Synthesis of alpha amylase d) Ripening of fruit

2. State true or false

i) Seed germination is a phytochrome mediated photoresponse
ii) Xanthium is a long-day plant
iii) An essential plant nutrient required for the regulation of stomatal opening and closing is calcium
iv) Vernalization shortens the vegetative period and hastens flowering

3 Fill in the blanks

i) Differential distribution of photo assimilates in different sinks of plant is called …..
ii) If a cell A has an osmotic pressure of 25 atm and T.P of 15 atm. and cell B has O.P of 30 atm and T.P of 10 atm. Then the net movement of water will occur from ……
iii) In rainy season the doors and windows swell up due to-------
iv) ……. is a deficiency symptom of phosphorus

4. Select from column B to match column A and C

i)	auxin	cell division Arrest of the cell division	F.W.Went 1928
ii)	gibberellin	Increase in mineral uptake Anti transpirant	Ohkuma.et.al 1965

iii)	Abscisic acid	Fruit ripening	Skoog and miller 1955
		Elongation of the internode	
iv)	Cytokinin	Stoppage of guttation	Sumuki and Yabuta1938
		Apical dominance	

5. **Answer in one word or in one sentence**

i) Name the amino acid that acts as a precursor for the biosynthesis of IAA.

ii) Osmotic potential iii) Ethylene iv) Florigen

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Active and passive absorption of water

7. D.P.D and water potential

8. Transpiration and guttation.

9. Phototropism and photoperiodism

10. Drought stress and salinity stress.

11. Nyctinastic and Seismonastic movement

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. Define the term "growth" as applied to plants. How can plant growth be measured?

13. What is turgor pressure? Can plant cells have negative turgor pressure values? Can you calculate the turgor pressure of a cell from water potential and osmotic potential values?

14. Discuss various types of senescence that can occur during plant development." Is senescence synonymous with "necrosis" (death)? Explain your answer.

15. Write note on critical photoperiod.

16. What are the causes of seed dormancy?

17. Evaluate the practical application of vernalisation in a tropical country like India.

18. The cell sap of the roots of halophytic plants has normally higher osmotic pressure than that of the cell sap of mesophytic plants. Why?

Section D

Answer any ***Six***

(Short-essay questions; Each question carries a weightage of 2)

19. Assume that a plant cell with a water potential of -1.0 bar is placed in a beaker containing a sucrose solution that has a water potential of -4.0 bar Further, assume the temperature of the solution is 24 C. Thus:

i) The plant cell will become
a). larger b.) Smaller c). Not change
ii) The weight of the plant cell will
:a). increase b). decrease c). not change
iii) The concentration of the sucrose solution in the beaker will:
a) increase b). decrease c). not change
iv) The turgidity of the plant cell will
a.) increase b). decrease c). not change
v) The osmotic potential of the sucrose solution will become
a). more negative b). less negative
vi) There will be a net movement of water from the
a). cell to the solution b). solution to the cell
vii) The cell will likely plasmolyse
a). False b) True

20. What is a mineral deficiency? How can a mineral deficiency be recognized? How can farmers benefit from nutrient analysis?

21. Discuss the mechanism of absorption of mineral salts by plants. How does it differ from absorption of water?

22 During the course you might have gone through a number of practical techniques used in the study of whole plant physiology. Discuss any one of these techniques.

23 "Explain how light leads to the opening of the stomata on the leaves of higher plants"

24. Describe the theory which you think best explains the mechanism underlying the translocation of organic solute through phloem.

25. How would you proceed to make a water culture? Explain the effects on plant of the omission of the salts of calcium, phosphorus and magnesium respectively?

26. Write an account on 'The resistance of plants to stress'.

Section E

(Essay type question. Answer any one; each question carries a weightage of 4)

27. Discuss the movement of water throughout a higher plant
28. What is a phytohormone? How many kinds of them are known to you? Describe atleast two phytohormones mentioning its structure, function and synthesis.

29 What is an essential element? How many have been identified? What is the difference between an essential element and a beneficial one? Provide examples of each. Give deficiency symptoms and roles of any three macro elements and one micro element.

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. Name :

KANNUR UNIVERSITY

B.Sc Botany **/ Plant Science-Theory Model Question Paper**

CORE– 14

6B14BOT**/PLS- BIOTECHNOLOGY, NANOBIOTECHNOLOGY AND PLANT TISSUE CULTURE**

Time: 3 Hours **Weightage: 30**

Section A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the Correct Answer

i) M13 is a

a) Plasmid vector b) cosmid vector c) viral vector d) Phagemid vector

ii)RFLP analysis is a technique that

a) uses hybridization to detect specific DNA restriction fragments in genomic DNA

b) is used to determine whether a gene is transcribed in specific cells

c). is used to detect genetic variation at the protein level.

d). is used to amplify genes for producing useful products

iii) The technique of recombinant DNA was initiated in

a) 1880s b) 1930s c) 1950s d) 1970s

iv) What is the function of restriction enzymes?

a) add new nucleotides to the growing strand of DNA

b) join nucleotides during replication

c) cut nucleic acids at specific sites

d) join nucleotides during transcription

2. State True or False

i) Human Genome Project was very successful in determining the functions of over 80% of the genes located in 46 chromosomes

ii) Ø x174 has a double stranded RNA

iii) Cybrids are synonymous to synthetic seeds

iv) HEPA type of filter is located in Laminar air flow

3. Fill in the blanks

i) An intercalating dye used to detect nucleic acid when viewed under uv light is------

ii) The expansion of PUC vector is------

iii) The function of Hup gene in Rhizobium is-----

iv)……..is a cloning vector that can be used to clone large DNA fragments (> 1 MB)

4. Select from column B to match column A and C

	A	B	C
i)	PBR322	Phage replacement vector	48.502kbp
		Phage insertion vector	
ii)	λgt10	Green fluorescence	6kbp
		Ampicilin resistance	
iii)	pLFR5	Cohen and Boyer	2676bp
		Lac Zgene	
iv)	pUC8	phagemid	4362bp
		cosmid	

5. Answer in one word or in one sentence

i) Plasmid vectors
ii) 'Golden rice'
iii) The "sticky ends"
iv) Arabidopsis is advantageous for plant genetic research . Why/

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. PBR322 and PUC

7. Nif gene and nod gene

8. Micro injection and shot gun

9. cDNA library and DNA library.

10. Southern and western blotting

11. Anther culture and protoplast culture

Section C

(Short answer questions. Answer any *five;* each question carries a weightage of 1)

12. What is the principle of blue-white selection for the presence of recombinant plasmids ?
13. What is a cDNA library ?List two advantages of a cDNA library over a genomic library.
14. What are single nucleotide polymorphisms? With the help of any two examples explain the relevance of studying SNPs.
15. Why are Ti-plasmid based vectors disarmed ? Where is the gene of interest incorporated in this plasmid ?
16. What is a callus and how can callus cultures be maintained for prolonged periods? List two applications of callus cultures.
17. What is meant by the term "totipotent"? Are all plant cells totipotent?
18. What is the advantage of having a poly linker in a cloning vector.

Section D

Short answer questions. Answer any six; each question carries a weightage of 2.

19. Enlist the six major steps in plant tissue culture. Name a medium commonly used for culturing plant parts and what factors dictate the choice of media?

20. a)Why is Agrobacterium tumefaciens regarded as nature's genetic engineer?
b) Describe vector-mediated and vector-less gene transfer in plants

21. Explain how adoption of biotechnological process in developed countries can cause economic hardships in developing countries

22. Give an account of the application of nanotechnology in life science.

23. What is the mechanism of gene action of the production of drought resistant plants?

24. What are type II restriction endonucleases (RE) ? Give an example of a type II RE, that generates blunt ends and the sequence recognised by it. Explain how REs are named. Mention two other enzymes and their utility in cloning experiments.

25. Schematically depict the method of recombinant DNA technology and name two methods of introducing recombinant DNA into host cells

26 What is a DNA probe ? Explain the principle of Maxam and Gilberts method of DNA sequencing.

Section E

(**Essay type question. Answer any one; each question carries a weightage of 4)**

27. Explain the genetics of nitrogen fixation. Give a brief account of regulation of nif gene expression.

28. What are the basic steps of a polymerase chain reaction (PCR)? How can we selectively amplify a DNA fragment ? Write two applications of PCR.

29. Write an account on the biotechnology of photosynthesis

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

CODE- 6B19PLS/BOT **(i)- ELECTIVE COURSE -1- UTILITY OF PLANTS AND MEDICINAL BOTANY**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) Useful part of Ragi is
a) caryopsis b) seed c) embryo d) fruit

ii) The family of Pineapple
a) Moraceae b) Pinaceae c) Bromeliaceae d) Musaceae

iii) Mace belongs to the family
a) Poaceae b) Fabaceae c) Myristicaceae d) Brassicaceae

iv) The oil obtained from oil palm
a) palm oil b) palm kernel oil c) both d) none

2. State true or false

i) Sweet potato is an industrial crop.
ii) Cinnamon is obtained from the leaves.
iii) At the time of latex collection, ammonia is added to avoid pre-coagulation.
iv) Edible part of apple is a pseudocarp.

3. Fill in the blanks

i) Palm oil is extracted from ……of the plant.
ii) The fibre used for making twines, ropes etc.
iii) In Pineapple, mature fruit contains ….. and ….. acid.
iv) Cumin belongs to the family ……..

4. Match the following

	A	**B**	**C**
i)	Gram	Mung bean	Glycine
ii)	Green gram	Pigeon pea	Cicer
iii)	Soya bean	Chick pea	Cajanus
iv)	Cajan pea	Japan Pea	Phaseolus

5. Answer in one word or in one sentence

i) Poor man's milk
ii) Tridhoshic concept
iii) Ethnomedicine
iv) latex

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Root tuber crops and Stem tuber crops

7. Condiments and Spices

8. Indigo and Henna
9. Cereals and Pulses
10. Traditional medicine and Modern medicine
11..Black tea and Green tea..

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. Write a note about the morphology of useful part of Para Rubber, giving its botanical name, family and uses.
13. Write the botanical name of any four tropical fruits
14. Mention the botanical name, family, useful part and economic uses of Jute. Where does it grow in India?
15. Suppose that all plants of the world were to be destroyed except those belonging to five plant families. Which families would you select and why?
16. Give the botanical name and family of any fibre-yielding fruit and give its uses.
17. Give a general account of the plants whose economic products are exported from India.
18. Write about the different sugar-yielding plants.

Section D

Answer any ***Six***

(Short-essay questions*;* each question carries a weightage of 2)

19. Write about the economically important plants under Myrtaceae.
20. What do you mean by beverage? Write about the common beverage yielding plants giving their binomial, family and useful parts.
21. Select out the plants whose leaves are mainly useful. Add a note on their binomial, family and uses.
22. What are the major plant families producing vegetables, add a note on them and write the binomial of the plants you have studied under each.
23. Describe the different crude drugs obtained from the different vegetative parts of the plant body, giving botanical name, family, useful part and uses of the plants used.
24. Discuss the role of AYUSH, NMPB, CIMAP, CDRI and CMPR
25. Write a short essay on the different spices and condiments we use.
26. Write about the economic importance of mustard oil and coconut oil

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Write an essay on the importance of plants in primary healthcare citing examples of the common medicinal plants you have studied.
28. Discuss the importance of selected plant examples in Traditional vs. Modern medicine with special emphasis on structure, usage and pharmacological action of active principles.
29. With an introduction to each group, discuss the botanical name, family, morphology of useful parts and utility of the plants you have studied under major food items.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

ELECTIVE COURSE – 2

CODE- 6B19PLS/BOT **(ii) - PLANTATION BOTANY**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) …. is called secondary nutrients
(b) NPK (b) Mg,Ca,S (c)Organic manures (d) none of these

ii) A step-like configuration of the field along the contour by half filling to minimize soil erosion
(a) Contour planting (b) terracing (c) healing (d) none of these

iii) Mixing of fertilizer with irrigated water is called…..
(a) irrigation (b) saponification (c) fertigation (d) hydrogenation

iv) Gangabondam is a variety of ……..
(a) Cardamom (b) Pepper (c) Turmeric (d) Coconut

2.Write 'true or false'.

i). India is the largest exporter of tea in the world.
ii) FYM is a type of chemical fertiliser.
iii) Kattapak and Kalipak are the products of coconut.
iv) Bordeaux mixture is a fungicide.

3.Fill in the blanks

i) ……is an example of polygamomonoecious plant.
ii) In Rubber, the latex obtained from the bark of the tree by a process called ……
iii) Growing two or more vegetables in the same field at the same time is called ……..
iv) ---------is the inflorescence of Arecanut.

4 Match the following

A	B
i) Camelliaceae	Coffee
ii) Euphorbiaceae	Cashew
iii) Anacardiaceae	Rubber
iv) Rubiaceae	Tea

5. Answer in one word or in one sentence

i). Plant protectant
ii). IPM.
iii) Etiology
iv). Agronomic practice

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 Inflorescence of Cashew and Rubber.

7. Pesticides and Herbicides

8. Biofertilizers and Biocontrol agents.
9. Macro and Micronutrients.
10. Introduction and Acclimatization.
11. Hybridization and Micropropagation.

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. Harvesting and processing of Coffee.
13. Explain the botany of Arecanut.
14. Write the processing of Cashew.
15. Briefly describe the importance of soil and climate in agronomic practices.
16. Write a note on cultivation of Cashew.
17. Write a note on Budding.
18. Write about the importance of plantation crops in the economy of India.

Section D

Answer any *Six*

(Short-essay questions; each question carries a weightage of 2

19. Write about the origin, distribution, morphology, taxonomy, floral biology and morphology and biochemistry of the useful part of Tea.
20. Critically evaluate the present status of plantation crops in Kerala.
21. Explain harvesting and processing of Arecanut.
22. Write an explanatory note on nursery practices and production of planting materials..
23. What are the different plant introduction and selection techniques? Explain.
24..Write two fungal diseases of Coffee, their symptoms and control measures.
25. Write a note about the manures used in plantation crops.
26. Discuss the various growth regulators of plantation crops.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. With the help of labeled diagrams explain the propagation methods of plantation crops.
28. Justify the statement that "Tissue cultural technique is considered as an essential component of modern plant improvement programs".
29. Write the Botany, propagation, harvesting, storage and processing of the products of Coconut.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

ELECTIVE COURSE – 3

CODE- 6B19PLS/BOT **(iii)- NURSERY MANAGEMENT AND MUSHROOM CULTIVATION**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) The resting period of soil is called …….. .
(a) Fallow period (b) soil treatment (c) soil preparation (d) mulching

ii) Drip irrigation is otherwise called …..
(a) can watering (b) dry watering (c) mimicking a rain (d) fertigation

iii) Sprinkler irrigation is practiced in …….. crops.
(a) mushroom (b) vegetables (c) fruit crops (d) none of these

iv) The reproductive part of spawn is
(a) seed (b) culture (c) mycelia (d) grain

2.Write 'true or false'.

i). In India 90% of cultivation is Button Mushroom
ii) Flat bed is mostly used during spring season..
iii) Sphagnum moss is mostly used in the cultivation of Volvoriella species.
iv) pH 7 is an acid soil..

3.Fill in the blanks

i) Sunken nursery bed is prepared during …… season.
ii) …. is the white button mushroom
iii) Mushroom is cultivated by ….. … method
iv) ……. is called primary nutrients

4 Match the following

A	B
i) Green house	Vermiculate
ii) Organic manure	Spawning
iii) Pleurotus spp.	Watering
iv) Gravity irrigation	Nursery management

5. **Answer in one word or in one sentence**

i). Soil treatment
ii). Fallow period
iii) Hot beds
iv). Cold frames

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 Drip and Sprinkler irrigation.
7. Mulching and Spawning
8. Edible and Poisonous mushrooms.

9. Crop management and Crop rotation.
10. Flat beds and Raised beds.
11 Spawn run room and Croping room

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. Write a note about soil preparation.
13. With the help of diagrams explain various types of nursery beds.
14. Describe the nutritive value of Mushroom.
15. Write the importance of nursery management.
16. What are the preplanting treatments practiced in the nursery bed?
17. Write a note on fertilizers.
18. Discuss the requirements of a culture room.

Section D

Answer any *Six*

(Short-essay questions*;* each question carries a weightage of 2

19. Explain various types of irrigation methods.
20. Explain the process of transplantation of nursery plants.
21. Write a note about plant growing structures.
22. Explain the preparation of Bordeaux mixture.
23. Write the main characters of edible mushrooms.
24..Explain in detail five different types of garden tools and give their uses
25. Describe the harvesting and post-harvest management of mushrooms.
26. Write a note about the scope of nursery management and mushroom cultivation.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Explain the procedure of the cultivation of Paddy straw mushroom.
28. Describe the process of nursery management and media preparation.
29. Explain the procedure of cultivation of *Agaricus bisporus*.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

CODE- 6B19PLS/BOT **(iv)- ELECTIVE COURSE -4- ETHNOBOTANY**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) The Goddess Lakshmi is believed to reside in
a) Water lily b) Aegle c) Nerium d) Tulsi

ii) Tender shoots used as vegetable
a) Aegle b) Achyranthes c) Dioscorea d) Entada

iii) Plant in sacred grove and having miscellaneous use
a) Helicteres b) Calotropis c) Carissa d) Bambusa.

iv) In India ……. is considered as the prison of all demons.
a) Strychnos b) Mango c) Alstonia d) Burning incense

2.Write 'true or false'.

i). *Aegle marmelos* belongs to the family Myrtaceae

ii) Ethnobotany has no connection with other sciences.

iii) Ethnomycology deals with the study and use of fungi by man for several purposes.

iv) Ethnic people live in localities immensely rich in biodiversity.

3.Fill in the blanks

i) The term 'Ethnobotany' was first used by a botanist named …..in the year …….

ii) Ritualistic dances and dramatizations based on the local deities that protect the groves are called -------.in Kerala.

iii) --------is the name attributed to sacred grove in native language.

iv) The word 'Ethnobotany' comes from --------study of culture and …….study of plants.

4 Match the following

	A	**B**
i)	India	Red Indians
ii)	Greenland	Scheduled Tribe
iii)	Costa Rica	Hill Tribes
iv)	Bangladesh	Eskimos

5. **Answer in one word or in one sentence**

i).Father of Ethnobotany

ii) Name two tribal communities in South India.

iii) Define Ethnobotany

iv) The founding father of modern Ethnobotany.

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 Ethno ecology and Ethno taxonomy

7. Traditional and Modern Ethnobotany

8. Shifting Cultivation and Crop Rotation
9. Anthropology and Palaeoethnobotany
10. In situ and ex situ conservation
11. Ethno pharmacology and Ethno toxicology

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. List out the names of 2 scientific journals covering ethnobotanical research.
16. What are the functions of an ethno botanist?
14. In the beginnining, ethnobotanical specimens and studies were not very reliable and not much helpful. Why?
15. Write about the historical background of Umbrella stones.
16. List out the names of sacred groves and Socio- religious belief.
17 Tribals strictly following the customs and habits are found to be healthier. Why?
18. Name the important plant ecosystems preserved in Kerala by religious beliefs.

Section D

Answer any *Six*

(Short-essay questions*;* each question carries a weightage of 2)

19. A great deal of information about the traditional use of plants is still intact with the tribals. Why?
20. Write a note on umbrella stones.
21. Write about the practical applications of Ethnobotany.
22. Explain the belief behind the custom of hammering nails into sacred trees.
23. Write a note on shifting cultivation and environmental chage.
28. What is the purpose of ethnobotanical journals?
29. Describe about ethnic agricultural practices..
26 Describe the importance of Ethnobotany in gene pool conservation.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27.What is Ethnobotany? Examine the importance, scope, categories and significance of Ethnobotany.
28.Discuss the role of ethnic and indigenous people of India and their culture in the conservation of biodiversity.
29.Explain the linkage of Ethnobotany with food and nutrition, medicine, sociology and culture and religion and social customs.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

CODE -6B19PLS/BOT **(v) - ELECTIVE COURSE-5- PHARMACOGNOSY**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) Which part of *Zingiber officinale* is used as drug?
a) leaf b) rhizome c) flower d) root

ii) *Aloe barbadens* belongs to the family
a) Euphorbiaceae b) Liliaceae c) Acanthaceae d) Solanaceae

iii) The non-crystalizable compound soluble in hot water
a) Resins b) Tannins c) Terpenoids d) alkaloids

iv)The German Scientist who introduced the term 'Pharmacognosy'
a) Pliny b) Schleiden c) Seydler d) Galen

2. State true or false

i) *Gloriosa superba* belongs to the family Euphorbiaceae.
ii) Phenolics are secondary metabolites.
iii) Natural system of classification is included in the classification of crude drugs.
iv) *Adhatoda vasica* is endemic.

3. Fill in the blanks

i) *Ferula asafetida* belongs to the family ……..
ii) The word pharmacognosy is derived from…….
iii) System in which drugs are arranged according to their morphological or external characters is known as ……..
iv) ……plant yield alkaloid from fruit.

4. Match the following

	A	**B**	**C**
i)	*Adhatoda*	Zingiberaceae	Flower
ii)	*Datura*	Acanthaceae	Bulb
iii)	*Allium cepa*	Solanaceae	Rhizome
iv)	*Zingiber*	Liliaceae	leaf

5. Answer in one word or in one sentence

i) Ashtanga hridaya
ii) Any two soil types suitable for crude drugs.
iii) Phytochemistry
iv) Evaluation.

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Tannins and Dyes
7. Pharmacology and Pharmacognosy

8. Alkaloids and Turpenols
9. Pharmacological and Taxonomic classification
10. *Vetiveria zizanioids* and *Scoparia dulcis*
11. Anatomical and chemical evaluation

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. How terpenoids are classified? Mention their pharmaceutical importance.
13. What is meant by secondary metabolites?
14. Write about endemic plants, giving two examples.
15. Describe and name two plants whose rhizome is used as medicine.
16. What is meant by organoleptic evaluation?
17. Write the functions of phenolics.
18. Write the cultivation method of any plant used in Ayurveda.

Section D

Answer any ***Six***

(Short-essay questions*;* each question carries a weightage of 2)

19. What are the merits and demerits of cultivation? Discuss various factors affecting cultivation.
20. Write about the sources of crude drugs.
21. Explain the phytochemistry and pharmacological action of a) *Gloriosa superba b) Phyllanthus amarus c) Allium cepa d)Datura alba*
22. Write detailed notes on morphological and chemical classifications.
23. Give a general account of medicinal plants used in Ayurveda.
24. What are alkaloids? Describe their properties and functions.
25. Give a detailed account of the historical background of pharmacognosy and add a note on its scope.
26. Describe the method of extraction of crude drugs.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Explain the various systems of classification of drugs from natural resources.
28. Write about the major ayurvedic preparations and formulations you have studied.
29. Give a detailed account of secondary plant metabolites and their properties.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

ELECTIVE COURSE – 6

CODE- 6B19PLS/BOT **(vi) - SEED TECHNOLOGY**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1.Choose the correct answer

i) The production of seeds by asexual methods is called ….
(a) Apomixis (b) Agamospermy (c) adventitious embryony (d) diplospory

ii) Most commonly used test to determine seed viability
(a) Tetrazolium test (b) germination test (c) vital colouring method (d) enzyme activity method

iii) Long-lived seeds are called ……..
(a) viable (b) recalcitrant (c) orthodox (d) none of these

iv) The point at which seed achieves its maximum dry weight is called …
(a) performance potential (b) physiological maturity (c) harvest maturity (d) none

2.Write 'true or false'.

i). Stratification is the chemical and mechanical removal of seed coat.
ii) Based on the fate of cotyledons or storage organs, there are two types of germination.
iii) Many tissues of plants can be induced to initiate and develop embryos.
iv) Mycotoxin in the food is produced chiefly by species of Aspergillus and Fusarium.

3.Fill in the blanks

i) …..is the barrier between embryo and its immediate environment.
ii) …. is the most successful and best advanced method of seed storage.
iii) A widespread cause of seed dormancy is the presence of a ……..
iv) ……. test utilizes the activity of dehydrogenase enzymes as an index to the respiration rate of viable seeds.

4 Match the following

A	B
i) Afterripening	Seed testing
ii) perisperm	Orthodox
iii) Roberts	Dormancy relieving
iv) AOSA	Nucellus

5. Answer in one word or in one sentence

i).Seed viability
ii).Quarantine
iii) Food storage reserves
iv).ISTA

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6 Embryo and Coat-imposed dormancies

7. Primary and Secondary dormancy.
8. Seed bank and Seed gene bank.
9. Transient and Persistent .seed banks
10. Scarification and Stratification
11 Orthodox and Recalcitrant seeds

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. Write a note about food storage structures of seeds.
13. Prolonged seed storage is important for those of wild plants also. Why?
14. What do you mean by a hard seed coat?.
15. What is the origin and meaning of the term *stratification*?.
16. What are the requirements for seed germination? Explain.
17. Write a note on containerized seed storage.
18. Critically examine the statement that the most successful and best advanced method of seed storage is that of cryopreservation.

Section D

Answer any *Six*

(Short-essay questions; each question carries a weightage of 2

19. Explain various types of seed dormancy .
20. Write about the processing of seeds for propagation in Agriculture.
21. Describe the four different stages in the development of a seed.
22. Explain why seeds placed in sealed storage at 13% moisture will deteriorate more rapidly than seeds in open storage? .
23. Is it correct to describe dormancy as merely a resting state? Explain..
24..Classify the seeds based on various parameters.
25. Describe the various methods of breaking seed dormancy.
26. Write a note about the somatic embryogenesis and organogenesis as a means of propagation.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Explain the various ways by which seeds are useful for the wellbeing of mankind.
28. Describe the process of seed formation and development mentioning the important factors affecting the process.
29. Write about the factors affecting the life span of seeds.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

Name :

5D01BOT/**PLS(i)** OR **6D02**BOT/**PLS(i)** -**OPEN COURSE -1. HORTICULTURE**

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer

i) The process of breaking dormancy of seed by cracking is called as
a) Scarification b) stratification c) sterilization d) none of these

ii) The development of embryo through asexual reproduction is called as
a) Apospory b) apogamy c) Apomixis d) none of these

iii)------- are called the primary nutrients in plants
a) Mn Zn K b) NPK c) Ca Mg K d) None of these

iv) The branch of horticulture, which deals with the cultivation of fruits, is
a) Pomology b) Olericulture c) palynology d) floriculture

2. True or false

i) Mycorrhizae are beneficial fungi that grow in a plant, symbiotic relationship on the root

ii)Growing of two or more vegetable crops in the same field at the same time is called mixed cropping

iii)Removal of moisture under controlled conditions of temperature, humidity and flow of air is called scarification

iv) Post harvested treatment given to vegetables for fast healing of mechanical injury, lowering the moisture contact and reducing the rotting of fungal growth is called curing

3. Fill in the blanks

i) A natural green carpet of garden in called----------

ii) The branch of horticulture, which deals with the cultivation of trees, is called----------

iii) Covering of an area, preferably a bed or a series of beds with dense, low growing herbaceous plants, creating some letters is called----------

iv) A step like configuration of the field along the contour, by half cutting and half filling, to minimize soil erosion is called as----------

4. Match the following

	A	**B**
i)	Snake gourd	*Momordica charantia*
ii)	Bitter gourd	*Lycopersicon esculentum*
iii)	Ladies finger	*Trycosanthes anguina*
iv)	Tomato	*Abelmoschus esculentus*

5. Answer in one word or in one sentence

i) Mulching

ii) Vermiculite

iii) Water garden

iv) Peat

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Rockery and Topiary
7. Olericulture and floriculture
8. Hedges and edges
9. Centering and tipping
10. Irrigation and fertigation
11. Hot bed and cold frame.

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. Why orchids are not propagated by seeds?
13. What is the significance of glass houses in Horticulture?
14. What may be done to increase the storage of some cut flowers?
15. During rooting periods of bulbs and corms, soil should be low in nitrates- explain.
16. What are suckers? How suckering can be promoted?
17. Write a critical note on drip irrigation.
18. Briefly describe the method of potting orchid plants.

. **Section D**

Answer any ***Six***

(Short-essay questions; each question carries a weightage of 2)

19. What are the parameters to be taken care during the harvesting of flowers?
20. Give a brief description of different methods of pruning and its significance in trees.
21. Write briefly on the cultivation methods used in Anthurium. Give the name of two commonly cultivated varieties.
22.Describe at least three different types of layerage and indicate their special applications.
23. Describe the principal practices of a production unit in a nursery.
24. Describe the common garden tools and implements.
25. Give an account of various plant protection measures for horticultural crops.
26. Write briefly on the cultivation methods used in Tomato, Bhindi and Brinjal.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Describe the various steps to grow Bonsai.
28. How can a good lawn be prepared?
29. Give an account of the different types of growth regulators and their uses in Horticulture.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

Name :

5D01BOT/**PLS(ii)** OR **6D02**BOT/**PLS(ii)** -**OPEN COURSE -2.**

MUSHROOM CULTIVATION AND MARKETING

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer

i) The largest producer of mushroom

a) India b) USA c) China d) Germany

ii) Oyster mushrooms are

a) *Agaricus* b) *Pleurotus* c) *Volveriella* d) None of these

iii) Umbrella shaped portion of basidiocarp is

a) Pileus b) Stipe c) Gill d) Annulus.

iv) ---------- is popularly known as Chinese mushroom.

a) *Agaricus* b) *Pleurotus* c) *Volveriella* d) None of these

2. True or false

i) Sphagnum moss is mostly used in the cultivation of *Volveriella sp.*

ii) In India 90% of cultivation is Button mushroom.

iii) Primary mycelium grows by clamp connection.

iv) N. Bahl has introduced the polythene bag method for growing paddy straw mushroom.

3. Fill in the blanks

i) ---------- is the white button mushroom.

ii) Agaricus belongs to the class ----------.

iii) Fruiting body of mushroom is known as ----------

iv) Interwoven fungal mycelium twist to form a rope like structure known as ----------

4. Match the following

	A	**B**
i)	i) *Agaricus*	Oyster mushroom
ii)	ii) *Volvariella*	Button mushroom
iii)	iii) *Pleurotus*	*Poisonous mushroom*
iv)	iv) *Amanita*	Paddy straw mushroom

5. Answer in one word or in one sentence

i) Dolipore septum

ii) Spawn

iii) Blanching

iv) Velum

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Sun drying and freeze drying

7. Edible mushroom and poisonous mushroom
8. Hymenium and sub hymenium
9. Homothallism and heterothallism
10. Primary mycelium and secondary mycelium
11. Spawn run room and cropping room

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. Name any poisonous species of *Agaricus*.
13. What is heterokaryotic condition?
14 Name two edible species of *Pleurotus.*
15 Scientific name of Indian Oyster mushroom.
16. What are the medicinal values of milky mushroom?
17. Who is the father of Mycology?
18. How many basidiospores are produced in a basidium?

. Section D

Answer any ***Six***

(Short-essay questions; each question carries a weightage of 2)

19. Write down the economic importance of *Agaricus.*
20. Write a short account on nutritive values of mushrooms.
21. What are the main characters of edible mushroom?
22. Give an account of common pests associated with mushrooms.
23. With the help of a labeled diagram describe the structure of *Agaricus* gill.
24. Give an account of poisonous mushrooms.
25. What are the different methods adopted for storage of mushrooms?
26. Comment on mushroom marketing.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Explain the life cycle of *Pleurotus* with the help of diagrams.
28. Describe the cultivation of Paddy straw mushroom.
29. Write an account on mushroom processing.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

Name :

5D01BOT/**PLS(iii)** or **6D02**BOT/**PLS(iii)**- Open Course-3

ENVIRONMENTAL SCIENCE

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; each bunch carries a weightage of 1)

1. Choose the correct answer

i. Trophic levels are formed by

(a)Only plants (b) Only animals (c) Only carnivores (d) Organisms linked in food chains

ii.The pyramid of energy is

(a)Always erect (b) Always inverted (c) Erect or inverted (d) None of these

iii. Deforestation reduces the chance

(a)Rain fall (b) Frequent cyclones (c) Soil erosion (d) Land slides

iv. Lichens are important in the study of atmosphere pollution because they

(a)Can grow well in polluted atmosphere (b) Can purify the atmosphere (c) Are sensitive to pollutant (d) None of these

2. True or false

i. Acid rains are caused by increased atmospheric concentration of NO2 and SO_2

ii. Heterophylly is found in submerged hydrophytes

iv. Vivipary is a characteristic feature of halophytes

v. The major reason for diminishing wild life is environmental pollution

3. Fill in the blanks

i. Every year, 5^{th} June is celebrated as ----------

ii. Bhopal gas tragedy occurred in the year----------

iii. ---------- book includes the list of threatened plants and animals.

iv. Afforestation with the purpose of environmental, aesthetic and economic development is known as ----------

4. Match the following

	A	**B**
i.	Sunken stomata	Hydrophytes
ii.	Velamen root	Halophytes
iii.	Pneumatophore	Xerophytes
iv	Air chamber	Epiphytes

5. Answer in one word or in one sentence

i Minamata disease

ii. Itai- itai disease

iii. Food web

iv. Climax community

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Alpha diversity and Beta diversity

7. Parasite and Epiphyte
8. Social forestry and Agro forestry
9. Renewable and non renewable energy resources
10. Primary succession and secondary succession
11. Grazing food chain and detritus food chain.

Section C

Answer any ***Five***

(Short answer questions; each question carries a weightage of 1)

12. The following is sequence of individuals linked though food

Wheat→ rat→ cat→ dog→ lion

a) What is this sequence called?
b) Which one represents the primary consumer?

13. In a particular locality, the organisms and the surrounding are reciprocally related.
a) What is the name given to such an integrated system?
b) What is the driving force of such a system?

14. Cactus plants can grow in areas exposed to drought
a) To which group does cactus belong? b) How do these plants manage drought?

15. Epiphytes develop a special tissue to absorb moisture from the atmosphere.
a) Name the tissue
b) What is its morphology?

16. Pollutants after production may often interact.
a) What is the name given to the product of interaction?
b) Give an example for such product.

17. What is nuclear holocaust?

18. Write the full forms of the following: a) MIC b) PAN

Section D

Answer any ***Six***

(Short-essay questions; each question carries a weightage of 2)

19. Write down the benefits and controversies regarding the construction of dams

20. Enumerate the benefits of forest resources

21. Mining poses several long term occupational hazards to the miners. Substantiate.

22. Give an account of Green house effect

23. What are the significances of rain water harvesting?

24. How does ozone layer protect us? What are the impacts of ozone layer depletion?

25. Write a critical note on radioactive pollution.

26. What are the reasons for population explosion?

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Compare the morphological and anatomical adaptations in Hydrophytes and xerophytes

28. What is *in situ* conservation? Explain the different types of protected site. Add a note on environment (protection) act.

29. List out the effect of air pollution and discuss the methods for solving/reducing air pollution.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

Name :

5D01BOT/**PLS(iv)** OR **6D02**BOT/**PLS(iv) -OPEN COURSE-4**

MEDICINAL PLANTS

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; each bunch carries a weightage of 1)

1. Choose the correct answer

i). The German scientist who introduced the term 'Pharmacognosy' is
a) Galen b) Schleiden c) Plini d) Seydler

ii) Atropine is obtained from
a) Belladonna b) Opium c) Aloe d) Vinca

iii) Which part of Asparagus is used as drug?
a) Leaf b) Root c) Stem d) Flower

iv) *Adhathoda vasica* is indigenous to
a) India b) China c) Madagascar d) None of these

2. True or false

i) NBPGR is National Board of Plant Genetic Resources.
ii) *Centella* belongs to the family Apiaceae
iii) *Asparagus* contains the glycosides shatavarins
iv) *Catharanthus* is indigenous to India

3. Fill in the blanks

i) Removal of dirt, sand, debris from crude drug is known as----------
ii) Homeopathic system of medicine was introduced by----------
iii) The process in ayurveda which leads to eradication of toxicity of harmful substance is called as ----------.
iv) *Allium cepa* belongs to the family ----------.

4. Match the following

	A	**B**
i)	*Zingiber*	Apocynaceae
ii)	*Aloe*	Euphorbiaceae
iii)	*Catharanthus*	Zingiberaceae
iv)	*Phyllanthus*	Liliaceae

5. Answer in one word or in one sentence

i) FRLHT
ii) Adulteration of drugs
iii) Unani system of medicine
iv) Phamacognosy

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Ex situ conservation and in situ conservation

7. Organized drug and unorganized drug
8. Quill bark and double quill bark
9. Alkaloid and glycoside
10. Biological source and geographical source of drug
11. Analgesic and antiemetic.

Section C

Answer any ***Five***

(Short answer questions*;* each question carries a weightage of 1)

12. Father of Indian ethnobotany.
13. Name two tribal communities in south India.
14. Name two plants whose rhizome is used as medicine.
15. Name the alkaloids in *Vinca*, which are active against malignant tumor.
16. Expand (a) ICAR (b) IMPB.
17. Head quarter of BSI.
18. What is diuretic?

Section D

Answer any ***Six***

(Short-essay questions*;* each question carries a weightage of 2)

19. Write a short note on major tribes of South India.
20.Briefly describe the role of NBPGR in cultivation and conservation of medicinal plants.
21. What are the major IPR issues related with cultivation and marketing of medicinal plants.
22. Give an account of cultivation of *Hemidesmus* and *Acorus calamus*.
23. Explain the role of major growth regulators in vegetable drug production.
24. List out the plants coming under 'Dhasapushpa' in ayurveda.
25. Write down any five folk medicines in Kerala and their uses.
26. Give an account of Sacred Groves.

Section E

Answer any ***one***

(Long-essay type questions; each question carries a weightage of 4)

27. Comment on various methods used for adulteration of drugs.
28. Write an account on classification of vegetable drugs.
29. Write an essay on Wild food plants.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

Name :

5D01BOT/**PLS(v)** OR **6D02**BOT/**PLS(v) -OPEN COURSE -5**

FORESTRY

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer

i) Deforestation generally decreases

a) Soil erosion b) Rain fall c) Drought d) Global warming

ii) Chemically all gums are

a) Polysaccharides. b) Proteins c) Lipids d) Vitamins

iii) Which of the following is not a germinating stimulating compound?

a) KNO_3 b) Thiourea c) Parasorbic acid d) Ethylene.

iv) Extensive planting of trees to increase cover is called.

a) Aforestation b) Social forestry c) Agro forestry d) Deforestation

2. True or false

i) 2, 3, 5, triphenyl tetrazolium chloride is used for testing the viability of seeds.

ii) The National Forest Policy has recommended 50% forest area in India.

iii) Early wood is otherwise called as spring wood.

iv) Turpentines are obtained from coniferous trees.

3. Fill in the blanks

i) Chipko movement in Tehri Garhwal region was initiated by ----------.

ii) The cell or row of cells containing latex is called ----------.

iii) Light coloured outer region of wood is known as ----------

iv) Forest research Institute of India is in ----------

4. Match the following

	A	**B**
i)	White dammer	*Canarium strictum*
ii)	ii) Black dammer	*Dalbergia sisso*
iii)	iii) Rose wood	*Coscinium fenestratum*
iv)	iv) Tree turmeric	*Vateria indica*

5. Answer in one word or in one sentence

i) Silviculture

ii) Coppice

iii) Seed dormancy

iv) Deciduous forest

Section -B

Answer any ***Four***

(Differentiate the following: Each question carries a weightage of 1)

6. Porous wood and non- porous wood

7. Taungya system and Jhum system of cultivation

8. Spring wood and autumn wood

9. Scarification and stratification
10. Grain and texture
11. Tropical forest and temperate forest

Section C

Answer any *five*

(Short answer questions*;* each question carries weightage of 1)

12. Name any two physical methods to overcome seed dormancy.
13. What is Lac?
14. Define heart wood.
15. What is heterogenous wood?
16. Name two fibre yielding plants.
17. Expand KFRI.
18. What are veneers?

Section D

Answer any *six*

(Short answer questions*; e*ach question carries a weightage of 2)

19. Describe various chemical methods to overcome seed dormancy.
20. List out the anatomical peculiarities of Jack wood and Teak wood.
21. Write down the ethnobotanical importance of *Aegle marmelos*.
22. Write an account of social forestry.
23. Describe the salient features of Indian Forest Act 1927.
24. Explain the importance of agroforestry.
25. Write a short note on the economic importance of *Dalbergia sisso*.
26. Explain the important measures to conserve forest.

Section E

Answer any one

(Essay type question; each question carries a weightage of 4)

27. Give an account of non timber forest products.
28. Briefly describe the forest types of India.
29. Explain the important physical properties of wood.

KANNUR UNIVERSITY EXAMINATION

Plant Science/Botany **-Theory Model Question Paper**

Reg. No: Code:

Name :

CODE- 5D01BOT/**PLS(vi)** OR **6D02**BOT/**PLS(vi) - OPEN COURSE -6**

BIOTECHNOLOGY

Time: 3 Hours **Total Weightage: 30**

Section - A

Answer ***All***

(Questions in bunches of four; Each bunch carries a weightage of 1)

1. Choose the correct answer

i) The forensic scientist obtained a small blood stained cloth of the suspect from the crime site. Which technique can be used to obtain sufficient amount of DNA present in the blood stain for further analysis?

a) PCR b) pH meter c) Western blotting d) Northern blotting

ii) Renuka isolated a gene 3000bp long, which she desires to cut into two. Which molecular tool would she use?

a) Klenow fragment. b) Restriction enzyme c) DNA polymerase d) Ligase

iii) Which technology involves combining two cells without cell walls from different species?

a) clonal propagation b)somatic embryogenesis c) protoplast fusion d) somaclonal variation.

iv) Karun inoculated a leaf segment into a medium containing auxins and cytokinins. After a month, he observed a white mass of cells in the culture. Name it.

a) Callus b) meristem c) shoot tip d) callose

2. True or false

i) RFLP stands for Restriction Fragment Length Polyploidy

ii) Nif gene incorporated transgenic rice plant is capable of utilizing atmospheric N_2.

iii) Gene therapy is a term used for replacing a defective mutant allele with a functional allele.

iv) Murashige is considered as the father of plant tissue culture.

3. Fill in the blanks

i) ---------- denotes the genetic capacity of a cell to regenerate into a complete plant

ii) A small circular DNA present in bacterial cells which is used in genetic engineering is called as ----------.

iii) ---------- bacterium is used in gene transfer in plants.

iv) The culture method for raising haploid plants is----------

4. Match the following

	A	**B**
i)	Restriction enzyme	*Agrobacterium rhizogenes*
ii)	Ri plasmid	Arber
iii)	DNA fingerprinting	*Agrobacterium tumefaciens*
iv)	Ti plasmid	Alec Jeffreys

5. Answer in one word or in one sentence

i) FISH
ii) PUC
iii) cDNA
iv) RAPD

Section B

Answer any ***Four***

(Differentiate between the following: Each question carries a weightage of 1)

6. Ti plasmid and Ri plasmid
7. RFLP and RAPD
8. Restriction endonuclease and Ligase
9. Genomic library and cDNA library
10. Electroporation and Microinjection
11. Western blotting and Northern blotting

Section C

Answer any *five*

(Short answer questions.*;* each question carries weightage of 1)

12.How can you obtain virus-free sugarcane plants from virus-infected plants? Are these plants virus-resistant? Give reasons.
13. What are edible vaccines? Mention two advantages of developing edible vaccines.
14. Why is nutrient medium autoclaved before it is used for tissue culture? How will you sterilise hormones, justify.
15. What is a cDNA library? List two advantages of a cDNA library over a genomic library.
16 .Give a brief account of biosensors
17. How does a doctor utilise nanobiotechnology to treat cancer?
18.. In which direction does the DNA fragment resolve in an electrophoretic gel.and why?

Section D

Answer any *six*

(Short answer questions*; e*ach question carries a weightage of 2)

19. A scientist wishes to prevent unauthorized copying of his invention. Mention the rules and regulations that you have studied to protect his rights
20. What is RAPD? Give a brief account.
21.What are the different types of restriction enzymes? What is common in the recognition sequence of all organisms which is recognized by restriction enzymes? Explain with an example.
22.What are the basic steps of a polymerase chain reaction (PCR)? Write two applications of PCR.
23. A nanomotor is placed in the body of a patient.:
    a) What is a nanomotor? b) How does it function?
24. Give a detailed account of Maxam-Gilbert method of DNA sequencing.

25. What do you know about DNA profiling (fingerprinting) and its applications?
26. Write briefly on Human genome project. What benefit one may expect from genome sequencing projects?

Section E

Answer any one

(Essay type question; each question carries a weightage of 4)

27. Describe the various gene transfer techniques in plants.
28. Comment on the applications of Nanotechnology in life sciences.
29. Give an account of recombinant DNA technology.

Sd/-
Dr.Kochuthressiamma Andrews
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