

**Model Question Paper**  
**FIRST SEMESTER M. SC. DEGREE EXAMINATION**  
**Branch : Botany (Specialisation in Ethnobotany and Ethnopharmacology)**  
**BE 211: ETHNOBOTANY, ETHNOPHARMACOLOGY AND**  
**INDIGENOUS/TRADITIONAL KNOWLEDGE**

**Time: 3 Hours**

**Max. Marks: 75**

**I. Answer the following questions :**

1. Define Ethnobotany.
2. What you mean by anti-hepatotoxic agents?
3. Define Acute Reference dose.
4. What are endotoxins?
5. Write a note on Sowa Rigpa.
6. Define pharmacokinetics.
7. What you mean by Intellectual Property Rights?
8. Define the term Biopiracy.
9. Expand and define 'AYUSH'.
10. Name any of the four tribal groups belonging to Kerala state.

**(10 x 1 = 10 Marks)**

**II. Answer the following questions not in more than 50 words :**

11. (a) Write the botanical name, family, important plant part and traditional uses of '*Ashwagandha*'.

OR

- (b). Write a short note on OECD guidelines.

12. (a) Differentiate between Ethnobotany and Economic botany.

OR

- (b) Explain the ethnomedicinal uses of *Janakia arayalpatra*.

13. (a) Comment on Aromatherapy.

OR

- (b) Differentiate Ayurvedic pharmacopoeia from pharmacology.

14. (a) Explain the importance of phyto-pharmacological screening in herbal drug development.

OR

- (b) Write a note on the contributions of AICRPE to ethnobiology of India

15. (a) What are free radicals? Explain its activity in biological system.

OR

- (b) Give your opinion about the factors causing biodiversity loss.

**(5 x 2 = 10 Marks)**

**III. Answer the following questions in not more than 150 words**

16. (a) Explain how the quality, safety and efficacy of herbal medicines can be evaluated?

OR

- (b) Explain any two *in vivo* experimental models for the evaluation of hepatoprotective activity

17. (a) What are the steps involved in the scientific validation of anti-diabetic drugs through ethno pharmacological research?

OR

(b) Explain the significance of Traditional Knowledge in herbal drug development.

18. (a) Explain the toxicity study models for herbal drugs.

OR

(b) Explain Kani/TBGRI Model of Benefit Sharing.

19. (a) Describe the various methods and techniques used in Ethnobotany for the field level activities of data collection.

OR

(b) Differentiate HPLC and HPTLC

20. (a) Point out Contributions of Dr. E. K. Janaki Ammal to Indian Ethnobotany.

OR

(b) Write a note on the factors causing herbal drug contamination.

21. (a) Explain the scope and applications of Pharmacognosy.

OR

(b) Explain in brief about any one Tribal/Folk community of Kerala State, focusing on anthropology, customs, beliefs and archaeological Ethnobotany.

22. (a) Screening for antioxidant activity of herbal drugs involves many steps. Explain

OR

(b) Write a note on Peoples biodiversity Register (PBR) and mention how students can contribute to PBR preparation.

**(7 x 5 = 35 Marks)**

**IV. Answer the following questions in not more than 250 words**

23. (a) Explain in detail the conservation of Traditional Knowledge and methods for protection of Traditional Knowledge.

OR

(b) Explain in detail the role of ethnic groups in conservation of plant genetic resources.

24. (a) Describe the microbiological evaluation of herbal drugs.

OR

(b) Discuss WHO guidelines for the assessment of herbal drugs.

**(2 x 10 = 20 Marks)**

**Model Question Paper**  
**FIRST SEMESTER M.SC. DEGREE EXAMINATION**  
**Branch: Botany (Ethnobotany and Ethnopharmacology)**  
**BE 212: HISTOLOGY, MICROTÉCHNIQUE & HISTOCHEMISTRY, BIOPHYSICS**  
**AND BIOSTATISTICS**

Time: 3 hrs

Max. Marks: 75

*Give illustrations wherever necessary*

**I. Answer the following questions**

- 1) What is Plastochron?
- 2) Explain 'F-test'
- 3) What is embedding? Name any two embedding medium
- 4) Explain Henderson and Haselbalch equation
- 5) Expand and explain ELISA
- 6) Write about Cerenkov radiation
- 7) Write a note on Wood extractives
- 8) What are Tylosoides?
- 9) Point out importance of Navashin fluid
- 10) What are Extraxylary fibres?

**(10 x 1 = 10 Marks)**

**II. Answer the questions in not more than 50 words**

11. a) Mention the types of reaction wood

OR

b) Write notes on wound callus and its significance

12. a) Define and explain ANOVA?

OR

b) Write the significance of t-test in plant sciences

13. a) Give a short note on ray parenchyma and its importance

OR

b) Point out the features of cell types in vascular cambium

14. a) Differentiate density gradient and differential centrifugation

OR

b) What is FISH? Mention the uses

15. a) Explain PARS reaction

OR

b) What is Squash preparation ? How can you perform it.

**(5 x 2 = 10 Marks)**

**III. Answer the following questions in not more than 150 words**

16. a) Describe briefly about the measures of central tendency

OR

b) Briefly describe chi-square test and its applications

17. a) Discuss the classical and recent concepts on root-shoot transition

OR

b) Explain the anatomical features of node and point out its phylogenetic interpretation

18. a) Discuss various types of microscopes. Add their working principles and applications

OR

b) Give a detailed account on electrophoresis

19. a) Explain the applications and limitations of enzyme histochemistry

OR

b) What is maceration? Explain the different types of maceration

20. a) Mention the role of anatomy in taxonomy

OR

b) Explain the influence of seasonal variation in cambial activity and point out the factors influencing the activity

21. a) Give the Principle and different types of centrifugation

OR

b) What are buffers? Write in detail the role of buffers in biological system

22. a) Describe the methods of sampling and types of errors that can happen in experiments

OR

b) Explain the experimental designs with special reference to the merits and demerits of each

(7 x 5 = 35 Marks)

**IV. Answer the following questions in not more than 250 words**

23. a) Compare the types of anomalous cambial activity citing relevant examples

OR

b) Describe the histochemical techniques used for the detection and localization of primary and secondary metabolites

24. a) Give a detailed account of chromatographic techniques

OR

b) Explain the different procedures involved in the preparation of permanent serial section of plant specimens

(2 x 10 = 20 Marks)

**Model Question Paper**  
**FIRST SEMESTER MSc DEGREE EXAMINATION,**  
**Branch: Botany (Specialization in Ethnopharmacology and Ethnobotany)**  
**BE 213. PHYCOLOGY, MYCOLOGY, BRYOPHYTES AND**  
**PTERIDOPHYTES**

Time: 3hr.

Max. Mark: 75

**I Answer the following questions:**

1. Explain amphigastria
2. Differentiate heterospory and heterophylly
3. What is Gleba?
4. Write a short note on Algal bloom
5. Differentiate between Cleistothecium and Apothecium
6. What is gelatinous Lichen? Give example.
7. What are elaters of Pteridophytes?
8. What is Soredia?
9. Write about Apogamy
10. Explain Sporodochium.

**(1X10= 10 Marks)**

**II. Answer the following questions in not more than 50 words**

11 a) Explain female sex organ in Rhodophyceae.

OR

b) Describe the chloroplast variation in Conjugates.

12 a) Briefly describe the structure and position of sporangia in *Isoetes*.

OR

b) Discuss the morphological nature of fertile spike of *Ophioglossum*.

13 a) Describe the various methods of dikaryotization in Basidimycetes

OR

b) Briefly explain reproductive methods of *Fusarium*.

14 a) What is peristome? Differentiate between orthodontous and nematodontous peristome.

OR

b) Give the salient features of Jungermanniales,

15 a) Explain thallus structure of lichen.

OR

b) Differentiate eusporangiate and Lepto sporangiate ferns.

**(5X2= 10 Marks)**

**III. Answer the following questions in not more than 150 words:**

16 a) Evaluate the economic importance of fungi with special reference to its secondary metabolites.

OR

b) Compare the structure of basidiocarp in *Polyporus* and *Lycoperdon*.

17 a) Classification of algae proposed by Lee.

OR

b) Briefly explain life cycle of *Padina*

18 a) Distinguish the petiole of *Osmunda* fern that of *Blechnum* on the basis of anatomy.

OR

b) Discuss origin and evolution of Bryophytes.

19 a) Give an illustrated account of life cycle of *Polytrichum*.

OR

b) Discuss the anatomical variations in Marchantiales.

20 a) Discuss the ecological and economic significance of Lichen.

OR

b) Give an account of reproduction in *Scytonema*.

21 a) Explain the evolution of sporogonium in Bryophyta.

OR

b) Give an account of the cell structure of prokaryotic algae

22 a) Write a note on reproduction in *Azolla*.

OR

b) Explain thallus organization and cell structure of *Hydrodictyon*. (7x5 = 35 Marks)

**IV. Answer the following questions in not more than 250 words:**

23 a) Describe in detail the thallus variations in Chlorophyceae.

OR

b) Describe the morphology, structure and phylogeny of the class Lycopsidea.

24 a) Discuss the thallus structure, reproduction and life cycle of *Aspergillus*.

OR

b) Give an account of gametophytes of Marchantiales, Jungermanniales and Anthocerotales.

(2x10 = 20Marks)

**Model Question Paper**  
**SECOND SEMESTER MSC DEGREE EXAMINATION**  
**Branch Botany (Specialization in Ethnobotany and Ethnopharmacology)**  
**BE 221: GYMNOSPERMS, ANGIOSPERM MORPHOLOGY AND TAXONOMY**

Time 3Hrs

Max Marks:75

**I. Answer the following questions**

1. Name the seed bearing organ in Pentoxylales
2. Mention the family having gynobasic style
3. Mention the source of Canada balsam
4. Which is the family that characteristically possess gynostegium?
5. Which family has rostellum in the flowers?
6. Name the plant in Solanaceae that yields an aphrodisiac drug
7. Mention the location of National botanical garden
8. Expand ICNCP
9. Name the family to which alligator weed belongs to.
10. Name the fossil gymnosperms having cupulate seeds (10 X 1=10 Marks)

**II. Answer the following questions not in more than 50 words**

11. What is epimatium?  
OR  
Write note on the leaf of Pentoxylales
12. Comment on the capitulum in Asteraceae  
OR  
List out the economic importance of Euphorbiaceae
13. Explain the mature ovule in *Ginkgo*  
OR  
Comment on BSI and its role
14. What is meant by autonym and basionym?  
OR  
Write notes on Principle of Priority
15. Describe the fruits of Apiaceae  
OR  
Outline the floral structure of Passifloraceae (5 X 2= 10 Marks)

**III. Answer the following questions not in more than 150 words**

16. Outline the importance of botanic gardens in taxonomic studies  
OR  
Comment on the evolution of Cycadales
17. Describe the economic importance of Gymnosperms  
OR

- Elaborate the affinities of Pteridospermales
18. Briefly discuss the origin of angiosperms  
OR  
Describe the origin and evolution of carpels
19. Outline Bessey's classification  
OR  
Briefly explain typification
20. Write notes on taxonomic keys and their utilization  
OR  
Describe taxometrics and its role in plant systematics
21. Give an account about the salient features of Asclepiadaceae. Add a note on its phylogenetic interrelationships  
OR  
Describe the floral biology of Orchidaceae with suitable illustrations
22. With the help of diagrams, explain the inflorescence of Poaceae  
OR  
Write critical notes on the androecium of Cucurbitaceae (7 X 5= 35 marks)

**IV. Answer the following questions not in more than 250 words**

23. With suitable illustrations, give a detailed account about the reproductive structures of Conifers  
OR  
Write an elaborate account about the APG system of classification
24. Outline the steps involved in the preparation of herbarium specimens. Add a note on the relevance along with special mention on National and regional herbaria  
OR  
Explain the floral characteristics seen in Scitaminae with suitable diagrams  
(2 X 10= 20 Marks)

**Model Question Paper**  
**SECOND SEMESTER M.SC. DEGREE EXAMINATION**  
**Branch: Botany (Specialization: Ethnobotany and Ethnopharmacology)**  
**BE 222 Pharmacognosy and Phytochemistry**

**Time: 3 Hrs**

**Max. Marks**

**75**

**I. Answer the following questions**

1. Name any one synthetic derivative of quinine that is efficient as anti-malarial drug.
2. In which class of phytochemicals vanillin belongs to ?
3. What is Pharmacopoeia?
4. Differentiate codified and noncodified systems of medicine.
5. Define the foreign matter in a drug.
6. Give two examples of Narcotic Drugs.
7. Which is the botanical source of 'liquorice'?
8. Which is the major class of secondary metabolite responsible for plant aroma?
9. Which is the biosynthetic pathway for eugenol?
10. Name any two hyphenated analytical techniques that involves separation and characterization techniques.

**(10X1=10 marks)**

**II. Answer the following questions in not more than 50 words:**

11. (a) What are the criteria for selection of solvents?  
OR  
Describe enflourage process?
12. What is the mechanism of microwave assisted extraction?  
OR  
What is the major information obtained from Infrared Spectroscopy (IR)?
13. (a) How can you explain unorganised drugs with suitable examples.  
OR  
(b) Differentiate between fixed oils and essential oils
14. (a) Describe different types of starch grains  
OR  
(b) Differentiate between oleoresins and resins
15. (a) Compare gums and resins with suitable examples  
OR  
(b) Write a note on histochemistry,, mentioning the importance

**(5X2=10 marks)**

**III. Answer the following questions in not more than 150 words:**

16. (a) Differentiate between  $^1\text{H}$  and  $^{13}\text{C}$  NMR spectroscopy.  
OR  
(b) Elaborate different ionization methods in mass spectrometry.
17. a) Illustrate and explain different types of stomata?  
OR  
(b) What is the structure of the monograph of a raw drug?
18. (a) Differentiate between Differential Scanning Calorimetry (DSC), Thermo Gravimetric analysis (TGA).  
OR

- (b) How phylogeny can be evaluated through chemotaxonomy?
19. (a) What do you mean by AYUSH Systems of Medicine? Describe.  
OR  
(b) How will you determine stomatal index and palisade ratio? What is its role in drug standardisation?
20. (a) Which are the major steps in Shikimic acid pathway ?  
OR  
(b) What is meant by dereplication studies in phytochemistry ?
21. (a) Describe ethnomedicine and ethnopharmacognosy  
OR  
(b) Differentiate adulterants and substitutes of raw drugs with suitable examples.
22. (a) Explain how terpenoids are biosynthesised in plants.  
OR  
(b) Elaborate the isoprene rule with examples.

(7X5=35 marks)

**IV. Answer the following questions in not more than 250 words:**

23. (a) What are the basic principles of chromatography and the different types of chromatography?  
OR  
(b) Elaborate the biosynthesis and utility of any one alkaloid.
24. (a) Define Pharmacognosy and describe its scope and objectives with special reference to its applications.  
OR  
(b) How will you determine the identity, purity and strength of a raw drug?

(2X10=20 marks)

**Model Question Paper**  
**SECOND SEMESTER M.Sc DEGREE EXAMINATION**  
**Branch : Botany (Specialization in Ethnobotany and Ethnopharmacology)**  
**BE 223 REPRODUCTIVE BIOLOGY, PLANT PHYSIOLOGY AND BIOCHEMISTRY**  
Time 3hours Max. Marks : 75

**I Answer the following questions**

1. Define semigamy?
2. What is parthenocarpy? Give an example
3. What is herkogamy?
4. What is glycolysis?
5. What are ribozymes?
6. What is the function of antifreeze proteins?
7. Name the photoreceptor by which photoregulation is achieved in plants
8. What is meant by respiratory climacteric?
9. What are compatible solutes?
10. Expand LHC

(10x1=10marks)

**II. Answer the following questions in not more than 50 words**

11. a) What is the difference between apospory and diplospory?  
OR  
b) Differentiate androgenesis and gynogenesis
12. a) Explain salvage pathway for purine synthesis  
OR  
b) What are the interactions stabilising the tertiary structure of protein
13. a) Explain zwitter ionic nature of aminoacids  
OR  
b) What is meant by feedback inhibition?
14. a) What are HSPs?  
OR  
b) Give the factors regulating photorespiration
15. a) Comment on the physiological adaptations of CAM plants  
OR  
b) What is senescence? What is the role of auxin in delaying senescence?

(5x2=10marks)

**III Answer the following questions in not more than 150 words**

16. a) Give your opinion about role of apiaries in crop improvement  
OR  
b) Explain the significance of pollen pistil interaction

17. a) Explain different types of Polyembryony. Mention its significance

OR

b) Explain the genetics of self sterility

18. a) Elucidate the pathway of gluconeogenesis

OR

b) Describe the synthesis of sucrose

19. a) Explain the various physiological and biochemical changes associated with fruit ripening

OR

b) What are the various biochemical changes associated with hydration and post hydration stages in seed germination?

20. a) Enlist and explain different functions of phytoalexins in plants?

OR

b) What are the different strategies adopted by plants for tolerating heat stress?

21. a) Explain Munch's hypothesis of photosynthate translocation

OR

b) Explain water oxidising clock and its significance

22. a) Give a detailed note on Ramachandran plot along with its applications

OR

b) Explain  $\beta$  oxidation of lipids

(7x5=35marks)

**IV. Answer the following questions in not more than 250 words**

23. a) Give an account of megasporogenesis in angiosperms with illustrations

OR

b) Explain HMP pathway and its importance

24. a) What are the various physiological adaptations of the plants which enable plants to tolerate drought, cold and salinity stress?

OR

b) Describe the structure and function of two photosystems in plants

(2x10=20marks)

**Model Question Paper**  
**THIRD SEMESTER M. SC. DEGREE EXAMINATION**  
**Branch : Botany (Specialisation in Ethnobotany and Ethnopharmacology)**  
**BE 231: GENETICS, CELL AND MOLECULAR BIOLOGY, IMMUNOLOGY**

Time : 3 hours

Maximum marks : 75

**I. Answer the following questions**

1. Differentiate complete and partial linkage.
2. What are homeotic genes?
3. Explain the term founder effect.
4. Mention the role of gyrases in DNA replication
5. State the importance of capping of mRNA.
6. What are NPC proteins?
7. What is CTAB? Mention its role in DNA isolation.
8. Explain Dot blot hybridization.
9. Draw and label the structure of an antibody molecule.
10. Differentiate acrocentric and telocentric chromosome.

(10x1=10 Marks)

**II. Answer the following questions in not more than 50 words**

11. a. Distinguish between innate and adaptive immune system.

OR

- b. Write any two important features of type I MHC.

12. a. Comment on any one New Generation Sequencing method

OR

- b. Write on the advantages of Real time PCR over traditional PCR.

13. a. Comment on characteristic features of Yeast Artificial Chromosome

OR

- b. What is meant by positive super coiling of DNA?

14. a. What is Apoptosis? Point out the significance

OR

- b. Mention the importance of cdk inhibitory proteins.

15. a. Mention the role of activators and enhancers in transcription

OR

- b. What is interference? How interference can be calculated?

(5x2= 10 Marks)

**III. Answer the following questions in not more than 150 words**

16. a. How transformation could be utilised for bacterial gene mapping?

OR

b. Explain how tetrad analysis is carried out for ordered tetrads and unordered tetrads?

17. a. Comment on the enzymology of DNA replication

OR

b. Write notes on any two mechanisms for DNA repair.

18. a. Briefly explain the CIB method of detection of mutations

OR

b. Write on the features of post transcriptional modification of mRNA in eukaryotes

19. a. Explain the structure and function of cytoskeleton.

OR

b. Write brief notes on the cytological behaviour of aneuploids.

20. a. Explain the role of telomere and telomerase in DNA replication

OR

b. Briefly comment on the principle and application of restriction mapping

21. a. Describe the different non-radio active labelling methods of nucleic acids.

OR

b. Write notes on the technique and applications of RACE and RAPD

22. a. Comment on humoral and cell mediated immune responses.

OR

b. Enumerate the basic features of genetic code.

(7x5=35 marks)

**IV. Answer the following questions in not more than 250 words**

23. a. Describe the Crisper/Cas system of gene editing

OR

b. Write notes on different types of cloning vectors used in molecular biology.

24. a. Give a detailed account on the various features of cell cycle regulation.

OR

b. Comment on the regulation of gene expression in eukaryotes during transcription.

(2x10=20 Marks)

**Model Question Paper**  
**THIRD SEMESTER M.SC. DEGREE EXAMINATION**  
**Branch: Botany (Ethnobotany and Ethnopharmacology)**  
**BE 232: ENVIRONMENTAL BIOLOGY, FOREST BOTANY, PLANT**  
**BIOTECHNOLOGY AND EVOLUTION**

Time: 3 hrs

Max. Marks: 75

*Give illustrations wherever necessary*

**II. Answer the following questions**

- 11) Explain ecotone
- 12) What is Metapopulation ?
- 13) Define Totipotency
- 14) What are Edible vaccines?
- 15) Write about Tn elements
- 16) What is Eutrophication?
- 17) What is Genome editing?
- 18) What are Cybrids?
- 19) Explain 'Redifferentiation'
- 20) Write a short note on Glaciation

**(10 x 1 = 10 Marks)**

**II. Answer the questions in not more than 50 words**

11. a) Give your comments on effects of global warming

OR

b) Write about the theory of island biogeography

12. a) Mention few minor forest products of Kerala

OR

b) Give your opinion about the major drivers of biodiversity change

13. a) Give a short note on Green protocol

OR

b) Write briefly about the environmental significance of mangroves

14. a) What is cell line selection?

OR

b) Write a note on artificial seeds and how it can be used in biotechnology

15. a) What is the methodology you can adopt for eradication of viruses in plant tissue culture?

OR

b) Write the applications of gametoclonal variations

**(5 x 2 = 10 Marks)**

**III. Answer the following questions in not more than 150 words**

16. a) Describe the phytogeographic regions of the world

OR

b) Discuss the various characteristics of a population

17.a) Give a brief description on forces and mechanism of evolution

OR

b) Write an explanatory note on classical and synthetic theories of evolution

18.a) Discuss how haploids are produced by plant tissue culture technique?

OR

(b) Explain the various applications of transgenic plants

19. a) Write an account of the factors controlling plant distribution

OR

b) Give an account of forest products of Kerala

20. a) Explain the technique and controversy of terminator gene technology

OR

b) How we can transfer a foreign DNA directly into plant cells?

21. a) Briefly describe *Agrobacterium*-mediated transformation

OR

b) Describe the use of bioreactor technology in the production of plant secondary metabolites

22. a) Describe the various global environmental problems

OR

b) Write the climax concept with suitable explanation on lithosere (7 x 5 = 35 Marks)

**IV. Answer the following questions in not more than 250 words**

23. a) Give a description on micropropagation and its applications

OR

b) Write an explanatory account on the application of plant biotechnology for the production of transgenic plants for improved traits citing suitable examples

24. a) Explain the theories concerning present and past distributions of plants globally

OR

b) Write an essay on the biogeographical zones of India (2 x 10 = 20 Marks)

**Model Question Paper**  
**THIRD SEMESTER M. SC. DEGREE EXAMINATION**  
**Branch : Botany (Specialization in Ethnobotany and Ethnopharmacology)**  
**BE 233 MICROBIOLOGY, PLANT PATHOLOGY, PLANT BREEDING AND**  
**HORTICULTURE**

Time : 3 hours

Maximum marks : 75

**I. Answer the following questions**

1. What are mollicutes?
2. Name the causative organism for the powdery mildew of Rubber.
3. Explain the term synthetic variety.
4. What are gene microcentres?
5. What are psychrophiles?
6. What is CPCRI? Where is it located?
7. Give the importance of Mist chamber in horticulture.
8. What is Arboriculture?
9. Differentiate heterosis and heterobeltiosis.
10. What are CMS lines?

**(10x1=10 Marks)**

**II. Answer the following questions in not more than 50 words**

11. a. Mention the salient features of Koch's postulates

OR

- b. What is a Chemostat?

12. a. Comment on Induced systemic resistance

OR

- b. What are Bio traps?

13. a. Mention the control measures of Red rot of sugar cane.

OR

- b. What are different types of plant introduction?

14. a. What is pedigree method of selection?

OR

- b. Give any two methods to overcome incompatibility.

15. a. What is Ideotype breeding? Who introduced this concept for the first time?

OR

- b. Illustrate and explain patch budding?

**(5x2= 10 Marks)**

**III. Answer the following questions in not more than 150 words**

16. a. Enumerate the importance of endophytic bacteria.

OR

- b. Write notes on the different nutritional categories of microorganisms?

17. a. Comment on the biochemical mechanisms of plant defence

OR

b. Write notes on the causative organism, symptoms and control measures of Sheath Blight of rice.

18. a. Give a short account of the Vavilov centres of origin of cultivated plants

OR

b. Mention the role of interspecific hybridization and polyploidization in crop improvement with suitable examples.

19. a. Differentiate gametophytic and sporophytic incompatibility.

OR

b. List out and explain the procedure of backcross breeding.

20. a. Explain the genetic basis of heterosis.

OR

b. Write notes on mutation breeding projecting the achievements in India.

21. a. Differentiate horizontal and vertical resistance

OR

b. Enlist and explain procedure for seed certification

22. a. Write notes on different kinds of gardening tools.

OR

b. Give the basic principles of landscape designing.

**(7x5=35 marks)**

**IV. Answer the following questions in not more than 250 words**

23. a. Briefly enumerate on the various types of artificial methods of vegetative propagation

OR

b. Write notes on the different methods of conservation of plant germplasm.

Give a note on a plant conservatory in your nearby area

24. a. Give the importance of commercial horticultural practices.

OR

b. Explain the role of microorganisms in agriculture with examples

**(2x10=20 Marks)**

**Model Question Paper**  
**FOURTH SEMESTER M. SC. DEGREE EXAMINATION**  
**Branch : Botany (Specialization in Ethnobotany and Ethnopharmacology)**  
**BE 241: HERBAL TECHNOLOGY, BIOINFORMATICS APPROACHES IN DRUG**  
**DESIGN AND DEVELOPMENT**

Time : 3 hours

Maximum marks : 75

**V. Answer the following questions**

1. What is metabolomics?
2. Define water repellence.
3. Name two herbal drugs.
4. Mention the role of Reverse Pharmacology.
5. Comment tools used in MSA.
6. What is RASMOL?
7. Mention its role of Bootstrap in Bioinformatics.
8. What is lead optimization?
9. Differentiate between primary and secondary nucleotide databases.
10. Define molecular clock concept.

(10x1=10

Marks)

**VI. Answer the following questions in not more than 50 words**

11. a. Distinguish between toxicity and allergenicity.  
OR  
b. Write any two important features of herbal drug from Kerala with global acceptance.
12. a. Comment on the active principles of cummin.  
OR  
b. What are the major regulatory measures adapted for the release of herbal product?
13. a. Comment on Molecular docking.  
OR  
b. What is meant by substitution matrix?
14. a. What is the significance of Gap Penalty?  
OR  
b. BLAST algorithm is fast and accurate. Justify.
15. a. Differentiate between the receptor suitability of Ion Channels and Histamine Receptors  
for drug development.

OR

- b. What is ligand-based drug design?

(5x2= 10

Marks)

**VII. Answer the following questions in not more than 150 words**

16. a. Briefly describe the secondary structure prediction by Chou and Fasman method.

OR

b. Write a note on Kimura's theory of molecular evolution.

17. a. Differentiate between gene tree and species tree.

OR

b. Write about topological features of phylogenetic tree.

18. a. Briefly explain the steps involved in molecular recognition of lead molecules.

OR

b. What are the major parameters for *in silico* drug design?

19. a. Give a short account of pairwise sequence alignment.

OR

b. Enlist and explain stepwise approaches applied in multiple sequence alignment?

20. a. Explain the role of drug designing in herbal technology.

OR

b. Briefly comment on the repurposing of herbal products for controlling epidemics and pandemic diseases.

21. a. Describe the different categories of plants used in Herbal Technology.

OR

b. Write about major approaches you can adopt in herbal drug extraction from plants.

22. a. Comment on the biotechnological intervention on the development of herbal drug.

OR

b. Give a critical evaluation on the significance of plants of Indian traditional medicine.

(7x5=35

marks)

**VIII. Answer the following questions in not more than 250 words**

23. a. Describe the major steps involved in the computer aided drug design for a typical lead molecule.

OR

b. Write notes on different types of tertiary structure prediction.

24. a. Give a detailed account on the various biological effects of nutraceuticals.

OR

b. Write a detailed account on herbal-drug and herb-food interactions, citing suitable examples.

(2x10=20

Marks)

**Model Question Paper**  
**FOURTH SEMESTER M.SC. DEGREE EXAMINATION**  
**Branch: Botany (Specialization: Ethnobotany and Ethnopharmacology)**  
**BE 242 II-SPECIAL PAPER - ETHNOPHARMACOLOGY,**  
**PHYTOPHARMACEUTICAL DRUG DEVELOPMENT, IPR AND PATENTS**  
**Time: 3 Hrs** **Max. Marks 75**

**III. Answer the following questions**

1. Define Crude drug
2. Write a short note on PBR
3. What are Adulterants?
4. What are Bioactive molecules?
5. Write about Arogyapacha
6. Explain the term Geographical indicator
7. Write a short note on Phytomedicine toxicity
8. What are Antioxidants?
9. Explain 'Shelf life of a drug'
10. What are Nutraceuticals? (10X1=10 marks)

**IV. Answer the following questions in not more than 50 words:**

11. (a) Name indigenous therapeutic uses of any two plants used by ethnic groups of Kerala.  
OR  
(b) Name two banned drugs of herbal origin and with the binomial plant part in use.
12. (a) Comment on Intrinsic toxicity and external toxicity of herbal drugs.  
OR  
(b) Comment on the various phytopharmaceutical drug formulations in use.
13. (a) What are the various on-line databases available that provide access to patent documents while conducting patent search?  
OR  
(b) How can computer programs in bioinformatics aid in development of a plant-based drug?
14. (a) Explain the scope preparing e-PBR.  
OR  
(b) We need new drugs in this new era to combat drug resistance, neglected tropical diseases and reemerging diseases, reflect on the statement.
15. (a) What is the significance of reference sample while manufacturing an herbal drug?  
OR  
(b) Can herbal drugs be released without clinical trials? Discuss.

(5X2=10 marks)

**V. Answer the following questions in not more than 150 words:**

16. (a) Comment on the role of anthropology in Ethnopharmacology.

OR

(b) Comment on the significance of IPR in the context of protecting of rights of indigenous communities?

17. (a) Write about the Standard operating procedures (SOPs) and Good manufacturing practices (GMP) in production of Phytopharmaceuticals.

OR

(b) Give a basic infrastructural layout of an herbal drug manufacturing unit.

18. (a) Enumerate regulatory guidelines for herbal medicine and pharmaceutical product development in India.

OR

(b) Describe major monographs in Indian pharmacopoeia and those released by ICMR

19. (a) Discuss the challenges and issues in development of herbal product.

OR

(b) Explain evidence based evaluation in Ethnopharmacology with examples.

20. (a) Write a note on cultivation, processing and storage of herbal plants.

OR

(b) What is the need for the preservation of biodiversity and indigenous knowledge?

21. (a) Discuss how indigenous plant varieties can be protected with laws under the umbrella of Intellectual Property Rights.

OR

(b) Write in brief the Intellectual property rights and add a note on IPR in pharmaceutical industry.

22. (a) Give an account on schedules to regulate and to aid in the proper use of ayurvedic drugs.

OR

(b) Discuss the guidelines set by department of AYUSH for drug development of ayurvedic formulations. **(7X5=35 marks)**

**VI. Answer the following questions in not more than 250 words:**

23. (a) Write in detail the scope and process of development of drug for commercial use from indigenous plants.

OR

(b). Explain the importance of traditional Indian remedies and regional folklore in modern medicine.

24. (a) Describe the techniques for identification, quantification, separation of chemical constituents of medicinal plant

OR

(b). Discuss the ethnopharmacological application of various plant groups with examples.

**(2X10=20 marks)**