

SUBJECT TITLE : BOTANY AND ANATOMICAL STRUCTURES
(WT)
SUBJECT CODE :
PERIODS/WEEK : 4
PERIODS/SEMESTER : 72
CREDITS : 4

TIME SCHEDULE

Module	Topics	Periods
I	Plant Diversity Test- 1	17 1
II	Plant Taxonomy Test- 2	17 1
III	Plant Anatomy Test - 3	17 1
IV	Primary and Secondary structure of stem and root Test - 4	17 1
Total		72

OBJECTIVES

MODULE I

1.1.0 Understand about plant diversity

- 1.1.1 Define the word Botany
- 1.1.2 Explain Eichler's system of plant classification
- 1.1.3 Define Algae
- 1.1.4 Explain Algae
- 1.1.5 Draw the sketch of Algae
- 1.1.6 Define fungi
- 1.1.7 Explain various type of fungi
- 1.1.8 Draw the fungi
- 1.1.9 Define Bryophytes
- 1.1.10 List Bryophytes
- 1.1.11 Explain Bryophytes with figure
- 1.1.12 Define pteridophytes
- 1.1.13 List pteridophytes
- 1.1.14 Explain pteridophytes, with sketch
- 1.1.15 Define Gymnosperms
- 1.1.16 Explain Gymnosperms
- 1.1.17 Differentiate Cycadales and coniferals
- 1.1.18 List cycadles and coniferals
- 1.1.19 Describe nucleans structure in general
- 1.1.20 Describe genetile material, nucleuic acid DNA (General structure)

- 1.1.21 Define genes, introns and exons
- 1.1.22 Explain gene activity, translator, transcription, lac, operon concept
- 1.1.23 Explain changes in gene structure, mutation (general study)
- 1.1.24 Explain changes in gene structure and it's effect on plant diversity

MODULE II

2.1.0 Understand about the morphology of root, stem and leaves and apply the knowledge to differentiate between root, stem and leaves

- 2.1.1 Define root system
- 2.1.2 Differentiate between taproot, fibrous root and adventitious root
- 2.1.3 Name some plants having different root system
- 2.1.4 Draw diagrams showing different root systems
- 2.1.5 Explain modification of root
- 2.1.6 Explain taproot modification
- 2.1.7 List some plants having taproot modification
- 2.1.8 Draw diagrams showing taproot modification
- 2.1.9 Describe adventitious root modification, draw diagrams
- 2.1.10 Define shoot system
- 2.1.11 Describe the function of shoot
- 2.1.12 Explain the underground modification of stem
- 2.1.13 List some plants of this type
- 2.1.14 Explain aerial stem modification
- 2.1.15 Draw diagrams of this type
- 2.1.16 List plants of aerial stem modification
- 2.1.17 Describe the parts of a leaf
- 2.1.18 Classify different type of leaves, - simple and compound
- 2.1.19 Define phyllotaxy
- 2.1.20 Describe phyllotaxy
- 2.1.21 List some plants having different phyllotaxy
- 2.1.22 Define inflorescence
- 2.1.23 List different types of inflorescence plants
- 2.1.24 Draw the diagram of above
- 2.1.25 Describe the parts of a flower
- 2.1.26 Distinguish dichlamydeom, monochlomydeom bisexual and unisexual flowers
- 2.1.27 Draw diagram of above
- 2.1.28 List the plants having different type of flower
- 2.1.29 Define aestivation
- 2.1.30 Draw diagrams
- 2.1.31 Define placentation
- 2.1.32 Classify the placentors
- 2.1.33 List placentors
- 2.1.34 Define pollination
- 2.1.35 Describe pollination

- 2.1.36 Define fertilization
- 2.1.37 Explain double fertilization with examples
- 2.1.38 Define embryo and endosperm
- 2.1.39 Define fruit
- 2.1.40 Classify fruits with examples
- 2.1.41 Draw diagrams
- 2.1.42 Define taxonomy of angiosperms
- 2.1.43 Explain binomial nomenclature
- 2.1.44 Identify the species and character of families such as –
annonaceae, papilionaceae, rubiaceae, verbinaceae, gramineae, malvaceae,
euphorbaceae, moraceae, myrtoceae, leguminaceae, sapindaceae, diptocarpaceae,
meliaceae, anacardiaceae, gramineae.
- 2.1.45 List some examples including economically important Indian
Timbers

MODULE III

3.1.0 Understand about plant anatomy and apply the knowledge to recognise all and organelles, tissues

- 3.1.1 Define Anatomy
- 3.1.2 Define cell
- 3.1.3 Draw diagram of cell
- 3.1.4 Describe the ultra structure of cell
- 3.1.5 Distinguish between living and non living inclusions in cells
- 3.1.6 Describe the cell wall with diagram
- 3.1.7 Explain the ultra structure of cell wall Explain the growth of
cell wall
- 3.1.8 Differentiate intussusceptions and apposition
- 3.1.9 Identify the chemical composition of cell wall
- 3.1.10 Define pits
- 3.1.11 Differentiate between simple and bordered pits
- 3.1.12 Draw the diagram of above
- 3.1.13 Define plasmodesmate
- 3.1.14 Draw the diagram of pits
- 3.1.15 Define tissues
- 3.1.16 Define meristem
- 3.1.17 Differentiate between meristematic & permanent tissues
- 3.1.18 Identify the character of meristem
- 3.1.19 Identify the different types of meristem based on position
- 3.1.20 Explain shoot apex with the diagram
- 3.1.21 Explain root apex with the diagram
- 3.1.22 Differentiate root and shoot apex
- 3.1.23 Describe the theories of meristem
- 3.1.24 Specify the apical cell theory, histogen theory and tunica
corpus theory
- 3.1.25 Define permanent tissues
- 3.1.26 Explain the various permanent tissues

- 3.1.27 Differentiate between simple and complex tissue
- 3.1.28 Draw diagram
- 3.1.29 Define vascular bundles
- 3.1.30 Explain origin of vascular bundles
- 3.1.31 Identify different type of vascular bundles
- 3.1.32 Draw diagram

MODULE IV

4.1.0 Understand about the primary structure of stem, root and leaves and the secondary structure of root and stem

- 4.1.1 Describe the primary structure with a sketch
- 4.1.2 Identify the primary structure
- 4.1.3 Describe the primary structure of dicot stem
- 4.1.4 Draw the diagram showing primary structure of dicot stem
- 4.1.5 List dicot plants
- 4.1.6 Describe the primary structure of monocot stem with examples
- 4.1.7 Draw monocot plants (structure)
- 4.1.8 Describe the structure of dicot root with sketches
- 4.1.9 List dicot root plants
- 4.1.10 List monocot root plants
- 4.1.11 Describe the structure of monocot root
- 4.1.12 Draw diagrams
- 4.1.13 Distinguish the dicot stem from monocot stem and dicot root from monocot root
- 4.1.14 Describe the structure of dicot leaf with examples
- 4.1.15 Draw diagrams
- 4.1.16 Describe the structure of monocot leaf with examples
- 4.1.17 Draw diagrams
- 4.1.18 Describe normal secondary growth in dicot stem
- 4.1.19 Define cambial ring
- 4.1.20 Explain importance of cambial ring
- 4.1.21 Define secondary xylems and secondary phloems
- 4.1.22 Define growth rings
- 4.1.23 Explain growth rings
- 4.1.24 Define wood
- 4.1.25 Differentiate sap wood and heart wood
- 4.1.26 Define tyloses
- 4.1.27 Explain the structure of tyloses
- 4.1.28 Draw diagram
- 4.1.29 Define periderm
- 4.1.30 Explain periderm formation
- 4.1.31 Draw diagram
- 4.1.32 Define phellum, phellogen and phelloderm
- 4.1.33 Distinguish between phellum, phellogen, and phelloderm
- 4.1.34 Define lenticel
- 4.1.35 Explain Lenticel with figure

- 4.1.36 Explain the function of Lenticel
- 4.1.37 Draw diagram Explain normal secondary growth in coniferals
- 4.1.38 List coniferal
- 4.1.39 Draw the structure

CONTENT OUTLINE

MODULE I – I:-

PLANT DIVERSITY

Introduction – Branches of Botany – Eichler’s system of plant, classification Algae – Fungui – Bryophytes – Pteridophytes, (General Account only with one example each). Gymnosperms – General Account – Cycadales and Coniferales – timber plants
 Plant cell – nucleus and it’s importance – genetic material – Nucleic acids – genes – gene action – structure of genes – change in gene structure leading to plant diversity.

MODULE II:-

PLANT TAXONOMY

Parts of a typical flowering plant (Eg., Root system – tap root, fibrous root, adventitious root)
 Leaves – Parts of a leaf – simple leaf – compound leaf – phyllotaxy, Inflorescence – definition – classification – racemose – cymose – special type flower – parts of a flower, type of flowers – essential parts – androecium and gynoecium – placentation – pollination – fertilization.

Angiosperm taxonomy:- Binomial nomenclature – description and identifying characters of the following families with emphasize on economically important plants.

1. Annonaceae - Annona, Polyalthia, Cananga
2. Papilionaceae - Crotalaria, Clitoria
3. Rubiaceae - Ixora, Hamelia
4. Verbanaceae - Latana, Tectona
5. Gramineae - Paddy, Panicum, Reed (Ochloa riedii), Red (O. travancoria) Bamboos and Arundinaceae, Saccharum officinarum.
6. Malvaceae - Bombax Malabaricum, Cullenia excelsa
7. Euphorbiaceae - Hevea brasiliensis
8. Moraceae - Artocarpus Interfolia, A. Hirsuta, A. Incisa
9. Leguminosae - Dalbergia latifolia, D. Sissooidio, Accasia,
10. Sapindaceae - Schleicharia trijuga
11. Myrtaceae - Eucalyptus spp.

MODULE III:-

PLANT ANATOMY

Cell – Ultra structure, living and non-living inclusions cell wall – Ultra structure – Micro and Microfibrills growth – Intussusceptions and apposition chemical composition of cell wall – pits – plasmodesmata.

Tissues – Meristematic and Permanent meristems – Definition – General characters – Types of meristems, based on position – origin shoot apex – root apex – theories of meristems – permanent tissues – classification – simple tissues – complex tissues.

Vascular bundles – origin – types – conjoint – collateral – tribi collateral – open and closed – concentric – amphivasal – amphidribal – radial.54

MODULE IV:-

PRIMARY AND SECONDARY STRUCTURE OF STEM AND ROOT

Primary structure of Dicot stem (centallon, cotton, sun hemp, cephalandra). Monocot stem (Grass,Coix), Dicot root (Limnanthemum, Ficus), Monocot root (Colocasia, coix, rhoeo)

Structure of dicot leaf (Ixora, hibiscus), Structure of monocot leaf (Grass)

Normal secondary growth in dicot stem – cambial ring – fusiform ray initials – cambial activity – secondary xylem – secondary phloem growth rings – ring porous – diffuse porous wood – sap wood– heart wood – tyloses – it's structure – periderm formation – phellum – phellogen – phelloderm –lenticels functions. Normal secondary growth in coniferals

REFERENCES:-

1. Algae, fungi and Bryophyta : B.R.Vashishta
2. Pteridophyta and Gymnosperms : B.R.Vashishta
3. Plant Anatomy : B.P.Pandey
4. Cytology : V.Venkiteswaralu
5. External morphology of Angiosperms : V.venkiteswaralu
6. Economic Botany : B.P.Pandey
7. Lecture notes on plywood technology Vol. I : IPIRI, Bangalore
8. Principles of wood science & technology Vol. II : F.P.Kollmann
9. College Botany Vol. 1,2,3 : Gangully & Karr
10. Taxonomy : Singh & Jain
11. Flora of Madras Presidency Vol. I,II, III : J.S.Gamble