B.SC (CBCS) BOTANY- II YEAR
Semester-IV- Paper IV
Plant Anatomy, Embryology and Palynology

DSC-1D (4 hrs./week) Theory syllabus

Credits-4
(60 hours)

UNIT - I:

1. Meristems: Types, histological organization of shoot and root apices and theories. (3h)
2. Tissues and Tissue Systems: Simple, complex and special tissues. (6 h)
3. Leaf: Ontogeny, diversity of internal structure; stomata and epidermal outgrowths. (6 h)

UNIT-II

4. Stem and root anatomy: Vascular cambium - Formation and function. (3h)
5. Anomalous secondary growth of Stem - *Achyranthes, Boerhaavia, Bignonia, Dracaena;* Root– *Beta vulgaris* (5h)
6. Wood structure: General account. Study of local timbers – Teak (*Tectona grandis*), Rosewood, (*Dalbergia latefolia*), Red sanders, (*Pterocarpus santalinus*) Nallamaddi (*Terminalia tomentosa*) and Neem (*Azadirachta indica*). (7h)

UNIT - III

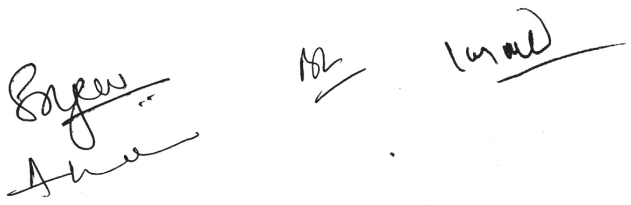
7. Introduction: History and importance of Embryology. (2h)
8. Anther structure, Microsporogenesis and development of male gametophyte. (6h)
9. Ovule structure and types; Megasporogenesis; types and development of female gametophyte. (7h)

UNIT-IV

10. Pollination - Types; Pollen - pistil interaction. Fertilization. (4h)
11. Endosperm - Development and types. Embryo - development and types; Polyembryony and Apomixis - an outline. (5h)
12.. Palynology- Pollen morphology, NPC system and application of Palynology. (6h)

References:

1. Bhattacharya et. al. 2007. A textbook of Palynology, Central, New Delhi.
2. Bhojwani, S. S. and S. P. Bhatnagar. 2000. The Embryology of Angiosperms (4th Ed.), Vikas Publishing House, Delhi.
3. M.R.Saxena- A textbook of Palynology.
4. Vashista- A textbook of Anatomy.
5. P.K.K.Nair- A textbook of Palynology.
6. Esau, K. 1971. Anatomy of Seed Plants. John Wiley and Son, USA.
7. Johri, B. M. 1984. Embryology of Angiosperms. Springer-Verleg, Berlin.
8. Kapil, R. P. 1986. Pollination Biology. Inter India Publishers, New Delhi.
9. Maheswari, P. 1971. An Introduction to Embryology of Angiosperms. McGraw Hill Book Co., London.
10. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.



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Theory Model Question Paper

Time: 2 hrs **Max. Marks: 40**

Draw well labeled diagrams wherever necessary.

I. Write short notes on any FOUR of the following: - **4 X 2 = 8M**

a.Types of Stomata.

b. parenchyma.

c. Different types of Ovules.

d. Exine stratification.

e. Rose Wood

f. Polyembryony

II . Essay Questions: **4 X 8 = 32M**

1 a .Classify Meristems ? Discuss in detail the various types of meristems.

(OR)

b. Theories associated with root apices.

2 a. Primary and secondary structure of *Boerhaavia diffusa* stem.

(OR)

b . Describe in detail the wood structure of *Pterocarpus santalinus*.

3 a . Discuss different Embryo sacs studied by you.

(OR)

b. Describe the development of Male Gametophyte.

4 a. Describe in detail various steps in Fertilization.

(OR)

b. Discuss in detail the various applications of Palynology.

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Practical syllabus

(45 hours)

Suggested Laboratory Exercises:

1. Demonstration of double staining technique. (3 h)
2. Tissue organization in root and shoot apices using permanent slides (3 h)
3. Preparation of double stained Permanent slides

Primary structure: Root - *Cicer*, *Canna*; Stem – *Tridax, Sorghum* (6 h)

Secondary structure: Root – *Tridax* sp.; Stem –*Pongamia*

Anomalous secondary structure: Examples as given in theory syllabus. (6 h)

4. Stomatal types using epidermal peels. (3 h)
5. Microscopic study of wood in T.S., T.L.S. and R.L.S. (6 h)
6. Structure of anther and microsporogenesis using permanent slides. (3 h)
7. Structure of pollen grains using whole mounts - *Hibiscus, Acacia* and Grass). (3 h)
8. Pollen viability test using Evans Blue – *Hibiscus* (3 h)
9. Study of ovule types and developmental stages of embryosac. (3 h)
10. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot embryos using permanent slides. (3 h)
11. Isolation and mounting of embryo (using *Cymopsis / Senna / Crotalaria*) (3 h)

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Practical Model Paper

Time: 2 $^{1}/_{2}$ hrs **Max. marks : 25**

1. Prepare a double stained permanent mount of transverse section of

   given material " A " . **9M**

2. Prepare a temporary mount of epidermal peel of the given leaf

   material " B " and identify the stomatal type . **4M**

3. Conduct the pollen viability test " C " (OR) Isolate the embryo from

   the given material . **4M**

4. Identify and describe the specimens / slides with well labelled diagrams

   (a) Embryology – D (b) Palynology – E (c) Anatomy – F **3 X 2 = 6M**

5. Record **2M**