

**Affiliated by Sant Gadge Baba Amravati University
Amravati.**

Department of Botany

B.Sc- II Year Sem- III

(Effective from session 2014-15)

- **The examination in Botany of Third semester shall comprise of one theory paper, internal assessment and practical examination.**
- **Theory paper will be of 3 Hrs. duration and carry 80 marks. The internal assessment will carry 20 marks.**
- **The practical examination will be of 5 hours duration and carry 50 marks.**
- **Each theory paper has been divided into 6 units.**
- **There shall be one question in every unit with internal choice for each of 12 marks & one compulsory question covering all the syllabus of Semester-III (8 marks).**

B.Sc. Part- II (Semester- III)

Angiosperm Systematics, Anatomy & Embryology

3S Botany

Marks: 80

UNIT I- Angiosperm Systematics and Biodiversity.

- 1.1 Angiosperms: Origin and Evolution (Pteridospermean and Bennettitalean Theory)**
- 1.2 Botanical Nomenclature: Principles of rules, Taxonomic Ranks, Type concept, Valid publication.**
- 1.3 Herbarium – Concept & significance, Royal Botanical Garden, Kolkata.**
- 1.4 Concept of biodiversity, Ex situ and In situ conservation**
- 1.5 Concept & importance of Biodiversity.**

UNIT II- Angiosperm Systematics

- 2.1 Systems of Classification: Bentham and Hooker's System, Engler and Prantle's system.
- 2.2 Systematic studies & economic importance of following Families
Dicotyledons (Polypetalae): Malvaceae, Brassicaceae, Leguminosae, Apiaceae,

UNIT III- Angiosperm Systematics

- 3.1 Systematic studies & economic importance of following Families
Dicotyledons (Gamopetalae): Asteraceae, Asclepiadaceae, Apocynaceae, Solanaceae, Verbenaceae, Lamiaceae.
- 3.2 Dicotyledons (Monoclamydeae): Euphorbiaceae.
- 3.3 Monocotyledons: Liliaceae, Poaceae.

UNIT IV- Anatomy

- 4.1 Types of Tissues:
Meristematic – Types of meristems Permanent – Simple and complex.
- 4.2 Characteristics of growth rings, Sapwood and heartwood.
- 4.3 Anatomy of root: Primary structure in dicot and monocot root, normal secondary growth in dicot root.

UNIT V- Anatomy

- 5.1 Anatomy of stem: Primary structure in monocot and dicot stem, normal secondary growth in dicot stem.
- 5.2 Anomalies in primary structure in *Boerhavia* stem, secondary structure in *Bignonia* and *Dracaena* stem.
- 5.3 Leaf Anatomy: Internal structure in *Nerium* and *Maize* leaf.

UNIT VI- Embryology

- 5.1 Microsporangium, microsporogenesis, development of male gametophyte.
- 5.2 Megasporangium, types of ovules, megasporogenesis, development of female gametophyte (monosporic, Bisporic & tetrasporic).
- 5.3 Double fertilization and triple fusion.
- 5.4 Embryo – Classification of embryo.
- 5.5 Endosperm types & significance, Suspended animation

Laboratory Exercises

- 1) Embryology of Angiosperms:
 - i) Observation of wide range of flowers available in the locality and methods of their pollination.
 - ii) Study through permanent slides of T.S. of anthers, microsporogenesis, L.S. of ovule, types of endosperms and embryo of *Capsella*.
 - iii) Mounting of T.S. of anthers, Pollen grains and pollinia.
- 2) Anatomy of angiosperms : Preparation of double stained slides of root, stem and leaves of angiosperms mentioned in the syllabus.
- 3) Taxonomy : Description of ten plants belonging to different families in technical language and identification up to family level.
- 4) Long and short excursion is essential

Note : Field tour reports should be supported by exhaustive field notes and photographic representation of plant species studied

Brassicaceae- *Brassica*, **Malvaceae-** *Hibiscus*, *Sida*, *Malvastrum*, **Fabaceae-** *Crotalaria*, *Indigifera*, *Tephrosia*, **Caesalpinoideae-** *Caesalpineae*, *Cassia*, **Mimosoideae-** *Prosopis*, *Acacia*, **Apiaceae-** *Corindrum*,
Apocynaceae- *Vinca*, *Thevetia*, **Asclepiadaceae-** *Cryptostegia*, *Calatropis*,
Solanaceae- *Datura*, *Solanum*, *Withania*, **Euphorbiaceae-** *Croton*, *Jatropha*, *Euphorbia*, ,
Lamiaceae- *Oscimum*, *Hyptis*, **Asteraceae-** *Tridax*, *Lagasca* **Verbanaceae** – *Lantana*, *Clerodendron*

PRACTICAL EXAMINATION

Time;- 5 Hours

Max. Marks- 50

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| Q.1 Preparation of double stained permanent micropreparation of given angiospermic Material
Identification with reasons | 10 Marks |
| Q.2 Description of given angiospermic plant in technical language, identification up to family,
floral formula, floral diagram | 20 Marks |
| Q.3 Spotting (taxonomy-1, anatomy-2, Embryology-2) | 10 Marks |
| Q.4 Class record, Excursion report with plant photographic submission | 06 Marks |
| Q.5 Submission of micropreparation and viva voce | 04 Marks |

Books Recommended :

- 1) **A.C.Dutta** : Text Book of Botany.
- 2) **Andrews A.N.** : Studies in Paleobotany.
- 3) **Arnold C.A.** : Introduction of Paleobotany.
- 4) **Bhojwani & Bhatnagar** : Embryology of Angiosperms.
- 5) **Chandurkar** : Plant Anatomy
- 6) **Cutter E.G.**, 1971 : Plant Anatomy Experiment and Interpretation Part-II, Organs, Edward Arnold, London.
- 7) **Davis P.H.**, and Heywood V.H., 1993 : Principles of Angiosperm Taxonomy : Oliver and Boyd, London.
- 8) **Eames E.J.** : Morphology of vascular Plants. edition, prentice Hall of India Pvt.Ltd. New Delhi.
- 9) **Esau K.** : 1977, Anatomy of seed plant, 2nd Edition, John Wiley and Sons, New York.
- 10) **Gangulee & Kar** : College Botany Vol.II
- 11) **Gangulee Das and Dutta** : College Botany, Vol.I
- 12) **Gifford E.M. and Foster A.S.**, 1988 : Morphology and Evolution of Vascular Plants, W.H. Freeman & Company, New York.
- 13) **Hartmann H.T. and Kestler D.E.**, 1976 : Plant Propagation Principles and practices, 3rd
- 14) **Heywood V.H. and Moore D.M.** (Eds) 1984 : Current concepts in plant Taxonomy. Academic Press, London.
- 15) **Jeffrey C.**, 1982 : An introduction to Plant Taxonomy, Cambridge University Press, Cambridge, London.
- 16) **Maheshwari P.** : Introduction of Embryology of Angiosperms.
- 17) **Pande B.P.** : A Text Book of Angiosperms.
- 18) **Radford A.E.**, 1986 : Fundamentals of Plant Systematics, Harper and Row, New York.
- 19) **Rendle A.B.** : Classification of flowering plants, Vol.I & Vol.II.
- 20) **S.Sundar Rajan** : College Botany, Vol.II & Vol.III.
- 21) **Shukla & Mishra** : Paleobotany.
- 22) **Singh and Jain** : Plant Anatomy.
- 23) **Singh and Jain** : Taxonomy of Angiosperms.
- 24) **Singh, 4.** 1999, Plant Systematics - Theory and Practices, Oxford and IBH Pvt. Ltd., New Delhi.
- 25) **Stace C.A.**, 1989. : Plant Taxonomy and Biosystematics (2nd Edition) Edward Arnold, London.
- 26) **Stewart W.N.**, 1983 : Paleobotany and Evolution of Plants, Cambridge University Press, Cambridge. **Cutter, E.G.** 1969 : Part-I, Cells and tissues, Edward, Arnold, London.
- 27) **Trivedi B.S. & Sharma B.B.** : Introductory Taxonomy.
- 28) **Tyagi & Kshetrapal** : Taxonomy of Angiosperms.
- 29) **Vasistha P.C.** : Plant Anatomy.
- 30) **Vasistha P.C.** : Taxonomy of Angiosperms.
- 31) **Walton** : An Introduction & Study of fossil.
- 32) Modern Practical Botany, Volume-I, Dr.B.P.Pande, S.Chand Publication, New Delhi.
- 33) Modern Practical Botany, Volume-II, Dr.B.P.Pande, S.Chand Publication, New Delhi.
- 34) Modern Practical Botany, Volume-III, Dr.B.P.Pande, S.Chand Publication, New Delhi.