

**DEPARTMENT OF BOTANY
UNIVERSITY OF PUNE
PUNE 411 007**

The candidates appearing for Ph.D. entrance test in Botany are hereby informed the following:

The examination for paper II of Ph.D. Entrance Test in Botany will be conducted in the Department of Botany, University of Pune, Pune-411007 on **9th December, 2013** between **2.30 p.m. to 4.30 p.m.** (duration of Paper II is 2 hours).

The candidates should report to the Department of Botany, University of Pune, Pune-7 exactly at 2.00 p.m.

FORMAT OF QUESTION PAPER AND MARKING SYSTEM

- 1. The question paper will be for 100 marks.**
- 2. There will be 20 multiple choice questions on the given syllabus for one mark each – total 20 marks.**
- 3. There will be 12 questions of 10 marks each, of which 8 questions are to be attempted – total 80 marks.**
- 4. Duration of the paper will be 2 hours.**

Head

Department of Botany

S.S. Bhargava
Prof & Head
Dept. of Botany
University of Pune

UNIVERSITY OF PUNE
SYLLABUS FOR PET December 2013 – PAPER II BOTANY

1. **Principles of taxonomy** - Systematics and criteria for classification of plants, taxonomic structure, biosystematics, plant geography, floristics.
2. **Classification of plants** - Patterns of variation in morphology and life history in plants. Broad outlines of classification and evolutionary trends among algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms. Principles of palaeobotany.
3. **Biochemistry** – Structure of important polysaccharides in plants. Structure of nucleic acids. Protein structure, Enzymes and enzyme kinetics, regulatory enzymes.
4. **Molecular biology** – Chromatin organization, DNA replication and repair, transcription apparatus, transcriptional and post-transcriptional regulation, protein synthesis, targeting and degradation of proteins.
5. **Cell Biology** – Organization of plant cell wall, cell membrane, chloroplasts and other plastids, vacuoles, cytoskeleton. Perception and transduction of signals by cells. Totipotency, differentiation and death of cells.
6. **Genetics** – Principles of Mendelian genetics, linkage and recombination, genetic mapping. Variation in chromosome structure and number, inheritance of quantitative traits, gene frequencies in populations.
7. **Plant Physiology** – Water relations and membrane transport. Photosynthesis and respiration, nitrogen metabolism. Hormones.
8. **Vegetative development** – Organization and activity of shoot and root apical meristems, structure of stomatal apparatus. Structure and activity of cambium, wood structure and variations.
9. **Reproductive development** – Microsporogenesis and megasporogenesis, development of male and female gametophyte, fertilization and embryo development.
10. **Developmental regulation** – Role of hormones and light in regulation of seed germination and flowering. Patterning genes and their role in vegetative development and flowering.
11. **Plant Breeding** – Selection and production of pure lines, hybridization and hybrid breeding, mutation breeding. Conventional methods of breeding self-, cross-pollinated crops and vegetatively propagated crops.

12. **Plant-organism interactions** – Plant pathogens, pests, symbionts and their interactions with host plants. Plant defence mechanisms.

13. **Plant genetic engineering** – Agrobacterium – based vectors, transformation methods (including direct DNA transfer) and characterization of transformants, commercially available transformants. Polymerase chain reaction (PCR) and its applications.

14. **Plant resources and natural products** – Timber, fiber, food and spice yielding plants. Secondary metabolite pathways and phytochemicals used in aroma, flavor and medicine.

15. **Ecology** – Ecosystem: Structures, functions and types, ecological succession, ecological habitat and niche, concept of ecotone. Biomes – basis of classification, plant and animal communities associates with biomes.

16. **Environmental biology** - Pollution ecology, indicator organisms, restoration ecology with reference to plants and microbes. Environmental Impact Assessment and its role in sustainable development. National and International conventions and laws for protection and conservation of biological resources.