

FIRST YEAR SCIENCE, 2010-2011
BOTANY

PAPER I

ALGAE, LICHENS AND BRYOPHYTES

- Unit-1 General characters, thallus organisation, pigments and reserve food material in algae. Electron microscopic structure of *Chlamydomonas* and the Cyanophycean cell. Fritsch's Classification and modern trends in classification. Morphology, reproduction and evolutionary relationships in the following : Cyanophyta: *Oscillatoria*, *Nostoc*. Chlorophyta: *Chlamydomonas*, *Volvox*, *Hydrodictyon* and *Cladophora*.
-10 hours
- Unit-2 General characters of Xanthophyta, its relationship with Chlorophyta, Morphology and reproduction in Xanthophyta : *Vaucheria*; *Chlorophyta* : *Coleochaete* and *Oedogonium*; Charophyta : *Chara*. General account of Bacillariophyceae.
-10 hours
- Unit-3 Morphology and reproduction in Phaeophyta: *Ectocarpus* ; *Rhodophyta*: *Polysiphonia*. Economic importance of algae. Lichens: Important features, structure, habitat, importance as colonisers and indicators of environment. Vegetative multiplication and life cycle of *Parmelia* and *Usnea*.
-10 hours
- Unit-4 General characters and classification of Bryophytes. The evolutionary trends in thallus structure and sporogonium. Morphology and life history of *Riccia*, *Marchantia*, *Pellia*, *Porella* and *Anthoceros*.
-10 hours
- Unit-5 Morphology, life history and relationships of *Sphagnum* and *Polytrichum*. Economic and Biological importance of Bryophytes.
-10 hours

Note:

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A**- 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark. All the questions in **Section A** are compulsory. In **Section B**, 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each

question will carry 5 marks. The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks.

In short, pattern of question paper and distribution of marks for UG classes will be as under:

- ◆ **Section A:** 10 questions, 2 questions from each unit, short answer, all questions compulsory. Total marks : **05**
- ◆ **Section B:** 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**
- ◆ **Section C:** 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted. Total marks : **20**

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PAPER II

MYCOLOGY, MICROBIOLOGY AND PLANT PATHOLOGY

- Unit-1 Characteristics and broad classification of fungi with special reference to system proposed by Alexopolous and Mims. Structure and life history of *Albugo*, *Penicillium*, *Phyllactinia* and *Peziza*. Elementary knowledge of Mycorrhizae and their symbiotic significance. **-10 hours**
- Unit-2 Structure and life history of *Puccinia*, *Ustilago*, *Agaricus* and *Alternaria*. Economic importance of fungi: food, industries, medicine and biological controls. **-10 hours**
- Unit-3 Characteristics, classification, structure and reproduction of bacteria. Isolation and pure culture of bacteria, Gram's staining. Salient features of Microbiology of water, soil and food. **-10 hours**
- Unit-4 Characteristics, classification, structure and economic importance of Mycoplasma, Viruses: Nature, classification, structure, transmission and multiplication of plant viruses. **-10 hours**
- Unit-5 Principles of plant pathology. Methods of disease control. Study of symptoms, causal organism, perpetuation, etiology and control measures of following plant diseases: Green ear disease of Bajra. Loose smut of Wheat, Black Rust of Wheat, Citrus canker, Little leaf of *Solanum melongena* (Brinjal). Yellow vein mosaic of Bhindi. Tikka disease of ground nut. **-10 hours**

Note:

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A**- 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark. All the questions in **Section A** are compulsory. In **Section B**, 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks. The answers of each question should be given in about 250

words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks.

In short, pattern of question paper and distribution of marks for UG classes will be as under:

- ◆ **Section A:** 10 questions, 2 questions from each unit, short answer, all questions compulsory. Total marks : **05**
- ◆ **Section B:** 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**
- ◆ **Section C:** 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted. Total marks : **20**

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PAPER III

PALAEOBOTANY, PTERIDOPHYTES AND GYMNOSPERMS

- Unit-1 Characteristics and broad classification of pteridophyta. Stellar system in Pteridophytes. Geological Time Scale. Types of fossils, process of fossilization. Applied aspects of Palaeobotany. Structure of *Rhynia* and *Williamsonia*.
-10 hours
- Unit-2 Occurrence, structure and life history of *Psilotum*, *Lycopodium* and *Equisetum*.
-10 hours
- Unit-3 Occurrence, structure and life history of *Selaginella* and *Marsilea*. Homospory, heterospory and origin of seed habit.
-10 hours
- Unit-4 General characters, economic importance and broad classification of Gymnosperms. Occurrence, structure of life history of *Cycas*.
-10 hours
- Unit-5 Occurrence, structure and life history of *Pinus* and *Ephedra*.
-10 hours

Note:

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A**- 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of half mark. All the questions in **Section A** are compulsory. In **Section B**, 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 5 marks. The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have sub-divisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 10 marks.

In short, pattern of question paper and distribution of marks for UG classes will be as under:

- ◆ **Section A** : 10 questions, 2 questions from each unit, short answer, all questions compulsory. Total marks : **05**
- ◆ **Section B**: 10 questions, 2 question from each unit, 5 question to be attempted, at least 1 from each unit, answer approximately in 250 words. Total marks : **25**
- ◆ **Section C**: 04 questions (question may have sub-division), not more than 1 question from each unit, descriptive type, answer in about 500 words, 2 questions to be attempted. Total marks : **20**

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PRACTICALS

The practical exercises have been divided into following two groups based on the theory papers as detailed below:

- Group-I Algae, Fungi, Lichens, Microbiology and Plant Pathology,
Group-II Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany.

GROUP I

Microscopic preparations and study of following algal materials: *Nostoc*, *Oscillatoria*, *Chlamydomonas*, *Volvox*, *Coleochaete*, *Hydrodictyon*, *Cladophora*, *Oedogonium*, *Vaucheria*, *Chara*, *Ectocarpus* and *Polysiphonia*.

Study of different types of Lichen specimens.

Microscopic preparation and study of following fungal materials : *Albugo*, *Phyllactinia*, *Peziza*, *Penicillium*, *Ustilago*, *Agaricus*, *Puccinia* and *Alternaria*.

Study of some locally available materials showing plant diseases caused by Viruses, Mycoplasma, Bacteria and Fungi in field/ laboratory. Yellow vein mosaic of Bhindi, Little leaf of *Solanum melongena* (Brinjal), Citrus canker, Green ear disease of bajra, Rust and Smut of wheat and White rust of crucifers.

GROUP II

Study of external and internal morphology and microscopic preparations of following Bryophytes : *Riccia*, *Marchantia*, *Plagiochasma*, *Pellia*, *Anthoceros*, *Sphagnum* and *Polytrichum*.

Microscopic examination of fossil slide specimens/ photographs: *Rhynia* and *Williamsonia*.

Temporary, double stained microscopic preparations and study of stem/ rhizome, anatomy of following pteridophytes: *Psilotum*, *Lycopodium*, *Selaginella*, *Equisetum* and *Marsilea*. Study of temporary, single stained microscopic preparation of the following : Cone of *Lycopodium*, *Selaginella* and *Equisetum*. Petiole, Root and Sporocarp of *Marsilea* ; Rhizophore and *Selaginella*.

Temporary, double stained microscopic preparations of T.S., T.L.S. and R.L.S. of stem of *Pinus* and *Ephedra* and T.S. Leaflet and Rachis of *Cycas* and needle of *Pinus*, T.S. of normal and coralloid roots of *Cycas*. Microscopic preparations of male cone of *Pinus* and male and female cones of *Ephedra*. Study of male cone and megasporophyll of *Cycas*.

MARKING SCHEME

There shall be a practical examination of five hours duration and the distribution of marks shall be as follows :

	Students	
	Regular	Ex
1. A double stained section of plant part either of Pteridophyte or Gymnosperm glycerine mount	8	10
2. Minor preparation of Pteridophyte or Gymnosperm (not covered in Q.1)	5	7
3. Preparation and mounting of the part of :		
(a) A Bryophyte	7	8
(b) A Fungus	7	8
(c) An Alga	6	7
(d) Bacteria	6	7
4. Spots : Seven		
(a) One from each group (Algae, Lichen, Bryophytes, Fungi, Fossil, Pteridophytes, Gymnosperms).	14	14
(b) One phytopathological specimen for comments.	2	4
5. Viva-Voce.	10	10
6. Practical records	10	-
Total	75	75

BOOKS SUGGESTED

Alexopoulos, C.J.: Introductory Mycology, John Wiley and Sons, N.Y. 1978.

Bendre, A. and Kumar, A.: A Test Book of Practical Botany, Rastogi Publication, Meerut.

Ghemawat, M.S., Kapoor, J.N. and Narayan, H.A.: A Text Book of Algae, Ramesh Book Depot, Jaipur, 1976.

Gupta, M.N.: A Class Book of Gymnosperms, 1978.

Parihar, N.S.: An Introduction to Embryophyta, Vol. I. Pteridophyta, Vol.II, Central Book Depot, Allahabad, 1969.

Sharma, P.D.: Fungi, Rastogi Publications, Meerut, 1989.

Sharma, P.D.: Microbiology and Plant Pathology, Rastogi and Co. Meerut, 1989.

Vashishtha, B.R.: Botany for Degree Students (Algae, Fungi, Bryophyta and Gymnosperms), S. Chand and Co., New Delhi, 1976.

Singhvi, V., Pandey, P.C. and Jain, D.K.: A Text Book of Botany, Rastogi and Co., Meerut.