BOTANY HONOURS

MODEL QUESTIONS

B.Sc. PART-I

PAPER-I

- 1. Give short answers :
 - a) What is 'diatomaceous earth'?
 - b) What kinds of toxins are found in the Cyanophyceae?
 - c) Define phytoalexin.
 - d) What is growth curve in bacteria
 - e) What is cleistothecium?
- 2. Comment on the structural peculiarities of heterocyst that are relevant for nitrogen fixation
- 3. Explain the significance of heterothallism in the degeneration of sex in fungi.
- 4. Comment on the importance of lichens as an environmental biomonitoring agent.
- 5. Describe the ultrastructure of a blue-green algal cell. Give a comparative account of post-fertilization changes in *Polysiphonia* and *Ectocarpus*.
- 6. Give an illustrated account of the different sexual reproductive processes in fungi.Comment on parasexuality.
- 7. Write down the symptoms, disease cycle and control measures of a plant disease studied by you.
- 8. Describe the structure of a T4 bacteriophage with labeled skethes. Discuss the lytic cycle of this phage.

PAPER IIA

- 1. Give short answers:
 - i) State one algal character of Anthoceros.
 - ii) Where does microsporogenesis occur?
 - iii) Give the full form of NPC.
 - iv) What is palaeopalynology?
 - v) What is the function of peristome teeth?
- 2. What is peat and amber?
- 3. Trace the origin of Bryophytes from its lower group ancestors.
- 4. Discuss megasporogenesis.
- 5. Give a brief account of the applications of palynology.
- 6. Give a comparative account of the spore-dispersal mechanisms found in the bryophytes you have studied.
- 7. Discuss the modes of fossilization as outlined by Schopf.
- 8. Discuss the NPC classification of pollen grains.

PART II PAPER III

- 1) Give short answers:
 - a) Mention one aquatic character of Cycas.
 - b) Give the botanical name of the maiden-hair tree.
 - c) What is telome?
 - d) What is coenosorus?

- 2) Classify Pteridophytes according to Foster and Gifford upto class with examples.
- *3)* Describe the 'flowers' of *Gnetum* and show how they approach the typical angiospermic morphology.
- 4) Discuss anomalous secondary growth in plant stems.
- 5) Discuss the ultrastructure of the plant cellwall.
- 6) Define plant succession. Discuss the stages of plant succession in a xerosere.
- 7) Discuss the flora of the eastern Himalayas.
- 8) Discuss the age and area hypothesis of Endemism.

PART II

PAPER-IVA

1. Give short answers:

- a) What is a taxon?
- b) What is the full form of ICBN?
- c) What is meant by arboretum?
- d) What is neotype?
- e) What is hypanthodium?

2.State the biological significance of the "essential whorl" of a bisexual and a unisexual flower.

3. Mention the botanically important features of the family Euphorbiaceae.

4. Discuss the role of Botanical Gardens and Herbaria.

5. Write a note on consolidation phase of taxonomy stating the improvement

6. Give an account of the basis, merits and demerits of a system of classification studied by you.

7. Comment on, a)seed of Apiaceae, b)corolla of Brassicaceae, c) stamen of Rubiaceae, d) carpel of Poaceae.

8. Define placentation and placenta. Describe different types of placentation with suitable illustrations and examples.

PART III

PAPER-V

1. Answer the following in a few words:

a) What are the organelles where glycine is produced and decarboxylated in the C2 cycle.

b)What do you mean by the preparatory and pay-off phases of glycolysis?

c) What happens to the components of water potential during incipient plasmolysis.?

d) What is phloem-loading?

e) Define signal transduction.

2.Explain the phenomenon of cohesion-tension.Discuss its role during ascent of sap. What is cavitation?

3.Explain the mechanism of phosphorylation in the chloroplast or mitochondrion, based on the chemi-osmotic theory.

4. Distinguish between symbiotic and non-symbiotic nitrogen fixation. Why cannot the symbiotic fixation of molecular nitrogen take place in the presence of oxygen.?

5. Elucidate the terms –active transport, facilitated diffusion, antiport, symport and uniport with appropriate examples.

6. Describe, with suitable diagrams, the role played by K+ in the opening and closing of stomata. What is the role of ABA on the process?

7. Describe the reactions of the oxidative pentose phosphate pathway and discuss its metabolic significance.

8. What are the sites and enzymes of the primary and secondary carboxylation reactions in C4 plants. Write down the reactions driven by these enzymes. Justify the statement that " both C4 and CAM modes of photosynthesis will be redundant if the atmospheric concentration of CO2 becomes doubled in the future."

PART III

PAPER-VI

1. Answer in brief:

- a) What is karyotype?
- b) What are coupling and repulsion?
- c)What do you mean by polygenic inheritance?
- d)What is pericentric inversion?
- e)What is missense mutation?

2.Explain the differences between epistasis and dominance. How many loci are involved in each case?

3. Discuss the mechanism of gene regulation as proposed by Jacob and Monod.

4.From a field of garden pea plants, a random sampling of 11 plants is made. The height in cms.is as follows:

161,183,170,155,191,167,180,162,165,179,187.

Calculate the (i) Mean, (ii) Standard Deviation.

5.What are the different kinds of aneuploids? What are the meiotic pairing possibilities in an autotetraploid and triploid? Distinguish between genome allopolyploidy and segmental allopolyploidy.

6. What is semi-conservative replication? Discuss Messelson and Stahl's experiment to prove semi-conservative replication of DNA.

7.Write short notes on:

- a) Molecular mechanism of crossing-over.
- b) Incomplete linkage in plants.
- c) Transcription initiation in prokaryotes.

8.a) Give a brief account of the checkpoints of the eukaryotic cell cycle.

b) Explain at which stage of meiosis the chromosome number and the DNA content of the cell is reduced to half.

c) Define population, median and correlation coefficient.
