2023

M.Sc.

4th Semester Examination

BOTANY

PAPER : BOT-402A/402B/402D/402E/402F/402G

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.
Illustrate the answers wherever necessary.
Answer from **all** the Groups as directed.

PAPER : BOT-402A

(Angiosperm Taxonomy)

GROUP—A

Answer *any* **four** questions from the following : 2×4=8

1. Define Alfa and Omega taxonomy with examples.

2. Define isotype.

3. Define flora with an example.

4. Write the full forms of WWF and IUCN.

5. Define sporopollenin.

6. Define crytic species. Give an example.

GROUP—B

Write notes on *any* **four** from the following : 4×4=16

7. Periodicals and journals

8. Homology and analogy

9. Micromorphology

10. Principles of ICN

11. Traditional and digital herbarium

GROUP—C

Answer *any* **two** questions from the following : 8×2=16

12. Distinguish between exotic and invasive species. Name any two exotic and invasive species. Mention the effects of exotic and invasive species in the indigenous flora. 2+2+4=8

13. Define biodiversity. Who first proposed this term? What are the differences among Alfa-diversity, Beta-diversity and Omega-diversity? 1+1+6=8

14. What is taxonomic classic literature? Name the major taxonomic literatures with a short definition and respective examples. 2+6=8

15. Define co-evolution. Mention the differences between *ex-situ* and *in-situ* conservation. Write the importance of pollen bank and seed bank in conservation. 2+2+4=8

[Internal Assessment : 10 Marks]

PAPER : BOT-402B

(Cytogenetics)

GROUP—A

Answer *any* **four** questions from the following : 2×4=8

1. What is a ligand in cell signalling? Name the receptors that help polar ligands in signal transduction.

2. Characterize sphingosine, ceramide, cerebroside and ganglioside.

3. What is MPF in the context of cell cycle? State its role.

4. How can genetic bottleneck influence founder effect of a population?

5. Contrast the condition in polytene chromosome with polyploidy.

6. Mention three criteria for identifying B chromosome.

GROUP—B

Answer *any* **four** questions from the following : 4×4=16

7. Briefly describe four (4) different forms of intercellular signalling.

8. Characterize triglycerides, phophatidic acid and phosphoglycerides with respect to their chemical structures and significance in respect of cell membrane.

9. Comment on the enzyme-linked receptor in cell signalling.

10. Explain how different factors influence allele frequency in a closely reproducing population of a plant species.

11. Distinguish among actin filaments, intermediate filaments and microtubules.

12. Write a comprehensive note on the chromosomal uniqueness in bryophytes.

GROUP—C

Answer *any* **two** questions from the following : 8×2=16

13. Characterize different types of speciation. Explain how different demes constitute a species. 6+2=8

14. Write a comprehensive note on cell membrane ultrastructure illustrating its different components and their respective roles in imparting semi-permeability to the structure. 8

15. Elaborate different stages of cell cycle mentioning the check points and their significance. 8

16. How is the inheritance of quantitative characters dealt with? Highlight the difference between broad sense and narrow sense heritability 4+4=8

[Internal Assessment : 10 Marks]

PAPER : BOT-402D

(Microbiology Basic)

GROUP—A

Answer *any* **four** questions from the following : 2×4=8

1. What is quorum sensing?

2. What are oncogenes?

3. What is leghaemoglobin?

4. Define diauxic growth.

5. What is continuous culture?

6. What are prions?

GROUP—B

Answer *any* **four** questions from the following : 4×4=16

7. Write down the general characteristics of Actinomycetes.

8. Write short note on photosynthetic microorganism.

9. Discuss about the structures of the nitrogenase.

10. Write briefly about c-DNA library formation.

11. Write down the mode of action and applications of amylase.

12. Write down different mechanisms of drug resistance found in bacteria.

GROUP—C

Answer *any* **two** questions from the following : 8×2=16

13. Write down the mode of action of penicillin in bacteria. Mention the stages of biofilm formation. Write down the advantages of probiotics. 3+3+2=8

14. Write down the general characteristics of Spirochetes. Mention different steps for cultivation of plant viruses. 4+4=8

15. Briefly discuss chemosynthesis processes with example. Write a short note on purple sulfur bacteria. 4+4=8

16. Write down the application of plasmid in cloning technology. Write down the mode of action and application of proteases. 5+3=8

[Internal Assessment : 10 Marks]

PAPER : BOT-402E

(Mycology)

GROUP—A

Answer *any* **four** questions from the following : 2×4=8

1. What are the targets and mode of action of sordarin?
2. Name two first generation cephalosporins.
3. What is marmite?
4. Penicillin only destroys actively growing bacteria not dormant. Why?
5. What is tempeh?
6. What is the structure of cephalosporin?

GROUP—B

Write notes on *any* **four** from the following : 4×4=16

7. Griscofulvin
8. Fumaric acid
9. Cyclosporin
10. Gluconic acid
11. Heterokaryosis
12. Itaconic acid

GROUP—C

Answer *any* **two** questions from the following : 8×2=16

13. In which year penicillin was discovered and from which organism? What is its structure? What are natural and semi-synthetic penicillins? 2+2+4=8

14. Write notes on lactic and oxalic acid production. 4+4=8

15. Elucidate the mechanisms by which mycorrhiza benefit higher plants. 8

16. Comment on the roles of fungi in nutrient recycling and siderophore production. 4+4=8

[Internal Assessment : 10 Marks]

PAPER : BOT-402F

(Paleobotany, Palynology and Plant Reproductive Biology)

GROUP—A

Answer *any* **four** questions from the following : 2×4=8

1. Distinguish between anticline and syncline folds.

2. Name the most interesting organism of Gunflint formation. Mention its significance.

3. Differentiate between pebble and cobble.

4. What is meant by biostratigraphy?

5. Name two megafloral elements of Talchir formation.

6. What is meant by radio-carbon dating of rocks?

GROUP—B

Answer *any* **four** questions from the following : 4×4=16

7. Describe the process of formation of sedimentary rocks.

8. Enumerate the miofloristics recovered from Raniganj and Panchet formations.

9. Write down the megafloristics of Rajmahal formation. Mention the features of sedimentary deposition of Rajmahal formation.

10. Discuss the palaeontogical evidences in support of the 'continental drift hypothesis'.

11. Write brief notes on 'conformity' and 'unconformity'.

12. Chronologically arrange the 'Eras' and 'Periods' of a standard geologic time scale.

GROUP—C

Answer *any* **two** questions from the following : 8×2=16

13. What is three-fold system of classification of Indian Gondwana sequence? Mention the basis of this classification. Discuss the megafloristics of Pali and Parsora formations.

14. Describe the Euramerian flora of Permo-Carboniferous age.

15. Discuss the role of palaeobotany in relation to palaeoclimatology.

16. Briefly discuss about the Peri-Gondwana floras of India.

[Internal Assessment : 10 Marks]

PAPER : BOT-402G

(Plant Physiology)

GROUP—A

Answer *any* **four** questions from the following : 2×4=8

1. What are cadastral genes?
2. What are ephemeral plants? Give an example.
3. What is Hayflick phenomenon?
4. Define progressive senescence.
5. What is meant by apical dominance?
6. Mention the difference between channel and carrier involved in membrane transport.

GROUP—B

Write notes on *any* **four** from the following : 4×4=16

7. Heat shock proteins.
8. Programmed cell death
9. Brassinosteroids
10. Flower is a modified determinate shoot. Justify.
11. Mechanism of Na^{+} K^{+} pump
12. Characteristics of chloroplast genome

GROUP—C

Answer *any* **two** questions from the following : 8×2=16

13. Write a note on chloroplast chaperonins. Briefly describe about the assembly of plant RuBisCO enzyme. 4+4=8

14. Write about the genes that regulate floral development. Discuss about the ABC model of floral development. 3+5=8

15. What are SDGs and SAGs? Briefly describe about the biochemical events that take place during senescence. 3+5=8

16. Describe about the defense mechanisms of plants to mitigate biotic stress. 8

[Internal Assessment : 10 Marks]

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