M.Sc. 3rd Semester Examination, 2024

BOTANY

PAPER – BOT-303(A,B,C,E,F,G)

Full Marks : 50

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

PAPER : BOT-303A

Special Paper–(*Angiosperms Taxonomy*)

GROUP – A

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

1. Define paraphyly and explain its significance in taxonomy.

2. Define co-evolution with suitable example.

3. Define synapomorphy and synplesiomorphy.

4. Define Flora and vegetational with example.

5. What are Eudicots ? Example.

6. What are Basal angiosperms with examples.

GROUP – B

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

7. Differentiate between facultative and obligate mangroves. Give examples.

8. Explain the distinctions between old and new world mangroves with examples.

9. Define Parasitic & Hemiparasitic angiosperms with examples.

10. Distinguish between endemic flora and exotic flora with examples.

11. Define the following : Cryopreservation and Seed banks.

12. Briefly describe the role of Botanical survey of India for taxonomic studies.

GROUP – C

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

13. Differentiate between syntype and paratype. What are the basic differences between ICN and ICBN. Mention which country will be organized the next IBC ? Name a classical Taxonomic and Systematics Journal. $3 + 3 + 1 + 1$

14. What is plant systematics ? What are the differences between Taxonomy and Systematics ? Describe its scope and importance in modern botany. Define APG and mention the how many families and orders in this classification. $2 + 3 + 3$

15. Explain the concept of biodiversity hotspots. Who first coined this term ? How many Hotspots are found in the World ? Give examples from India. 2 + 1 + 2 + 3

16. Describe the functions of herbarium. How has digitization impacted traditional herbarium practices ? Name two digital and two traditional herbaria in India. 3 + 3 + 2

[Internal Assessment — 10 Marks]

PAPER : BOT-303B

(*Mycology*)

GROUP – A

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

1. Describe the structure of cephalosporin.

2. Who discovered fumaric acid & in which year ?

3. What is PGPF ? Name one phosphate solubilizer.

4. Name two endogenous factors responsible for spore dormancy.

5. Name two ascomycetous edible fungi.

6. Name one flavouring agent and its producer fungi.

GROUP – B

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

7. Griseofulvin

8. Succinic acid

9. Mycoremediation

10. Nutraceuticals

11. Heterokaryosis

12. Compare marmite and vegemite.

GROUP – C

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

13. What are SPBs ? Write a note on different types of SPBs found in fungi with their functions. $1 + 7$

14. What do you mean by 'Biocontrol' ? Write a note on different types of biocontrol mechanisms adopted in different fungi. $1 + 7$

15. Write notes on industrial productions of Oxalic and Lactic acids. $4 + 4$

16. What is semi-synthetic penicillin ? Name two semi-synthetic penicillins. Write a note on production of penicillin. Add the structure of Penicillin. $1 + 2 + 4 + 1$

[Internal Assessment – 10 Marks]

PAPER : BOT-303C

(*Cell Biology and Genetics*)

GROUP – A

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

1. Mention the role of glycolipids in different infectious diseases.

2. What is the 'biological species concept' ?

3. Narrate different kinds of cell signaling based on signaling distance.

4. How does genetic drift take place ?

5. What is founder effect ?

6. How does cardiolipin plays significant role in mitochondria ?

GROUP – B

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

7. Narrate different kinds of cell signaling based on signaling distance. $2 + 2$

8. How do the specific cyclins and cdks act harmoniously at different check points of cell cycle ?

9. Compare the broad sense and narrow sense heritability.

10. Explain quantum speciation with example.

11. Write a note on the potential application of B chromosomes.

12. Illustrate the ultrastructure of chloroplast grana and the roles of protein complexes in them.

GROUP – C

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

13. Write a comprehensive note on the roles played by various protein components of cell membrane.

14. What are 'demes' ? Illustrate how geographical displacement, preference of a new ecological niche and genetic bottleneck causes speciation by different means. $1 + 7$

15. Illustrate how changes of DNA and histone molecules cause epigenetic changes.

16. Elucidate the basic process of cell signaling.

[Internal Assessment – 10 Marks]

PAPER : BOT-303E

(*Special Microbiology*)

GROUP – A

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

1. What is continuous culture ? Mention one of its applications.

2. What are methanotrophs ? Give example.

3. Mention two cancer causing viruses.

4. Write down two properties of M13 ?

5. What is a major difference between prions & viroids ?

6. Name each of a rickettsial and mycoplasmal diseases.

GROUP – B

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

7. Write down the mechanism of action of streptomycine.

8. Write down structure and functions of leg-haemoglobin.

9. Discuss different characters of Mycoplasmas.

10. What is the function of *nif* gene in nitrogen fixation ?

11. Discuss the mechanism by which cellular oncogene becomes activated to cause cancer.

12. Mention the purification process after cultivation of animal viruses in chick embryo.

GROUP – C

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

13. Write short notes on : $4 + 4$

(*i*) Quorum sensing
(*ii*) Gyrase.

14. (*a*) What are Chemotrophs ? Give example of two green sulphur bacteria.

(*b*) Write down mechanism of nitrate respiration found in bacteria. $(2 + 2) + 4$

15. (*a*) Write down applications of recombinant DNA technology in agriculture.

(*b*) How ph affect bacterial growth ? $4 + 4$

16. Write notes on : $4 + 4$

(*i*) Plant microbe interraction
(*ii*) Plasmid.

[Internal Assessment – 10 Marks]

PAPER : BOT-303F

Special Paper–(*Palaeobotany, Palynology & Plant Reproductive Biology*)

GROUP – A

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

1. What is meant by guide fossil ?

2. The oldest life forms so far recorded from which formation ? Name two microbiota recovered from that time.

3. Differentiate between pebble and cobble.

4. What is meant by chronostratigaphy ?

5. Name two megafloral elements of Talchir formation.

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

GROUP – B

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

7. Describe the process of formation of sedimentary rocks.

8. Enumerate the miofloristics recovered from Pali and Tiki formations.

9. Write down the megafloristics of Rajmahal formations.

10. Chronologically arrange the 'Eras' and 'Periods' of a standard geolpgic time scale.

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

12. Discuss the Cathaysian flora of Upper Carboniferous.

GROUP – C

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

13. What is meant by Gondwana sequence ? Write down the basis of three fold classification of Indian Gondwana sequence. Discuss the mega floristics of Barakar and Panchet formations. $2 + 2 + 4$

14. Discuss briefly the early Mesozoic floras of Molteno and Chinle formation.

15. Describe the megafloral succession of the world during the period of Permo-Carboniferous.

16. Write down the methods of radiocarbon dating of rocks. Mention the limitations of it. $6 + 2$

[Internal Assessment – 10 Marks]

PAPER : BOT-303G

Special Paper–(*Plant Physiology, Biochemistry and Molecular Biology : Plant Physiology*)

GROUP – A

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

1. Differentiate between autocrine and paracrine signals.

2. What are ephemeral plants ? Give an example.

3. Name two metal-accumulator plants.

4. How can a plant produce pseudo-flowers ?

5. Name two compatible osmolytes accumulated in plants during heat stress.

6. What is meant by epigenetic regulation ?

GROUP – B

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

7. Cyclic AMP as second messenger.

8. Role of phytochelatin in metal toxicity.

9. Vernalisation-controlled epigenetic regulation of flowering.

10. Calmodulin.

11. Genes that regulate floral development.

12. Stress-induced PCD.

GROUP – C

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

13. What is the basic difference between oxidative and nitrosative stress ? Discuss about the

synthesis and role of nitric oxide in plant signalling. 2 + 6

14. What are the stages of signal transduction pathway ? Briefly describe about the mechanism of action of receptor tyrosine kinase. 3 + 5

15. Enumerate the effect of salinity stress in plants. Write in brief the strategies plants use to mitigate salt stress. 3 + 5

16. Write down the molecular basis of flowering in both LDP and SDP as controlled by phytochrome. 2 + 6

[Internal Assessment – 10 Marks]