# M.Sc. 3rd Semester Examination, 2023

## BOTANY

PAPER – BOT-303 **(Special Paper)**

*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*

## PAPER – BOT-303A

( *Angiosperms Taxonomy* )

GROUP – A

Answer any **four** questions from the following : $2 \times 4$

1. Define polyphyly.

2. Define co-evolution with example.

3. Define apomorphy with example.

4. What are taxonomic classics ? Give example.

5. What is the significance of "CAL" ?

6. What is endemism ? Give an endemic toxa from North East India.

## GROUP – B

Answer any **four** questions from the following : (Differences between the following) $4 \times 4$

7. Divergent and Convergent evolution.

8. True Mangrove and Mangrove associated toxa.

9. New and Old-World mangrove.

10. Holo and Hemiparasitic angiosperms.

11. Flora and Vegetation.

12. Holotype and Isolotype.

## GROUP – C

Answer any **two** questions : $8 \times 2$

13. What is plant nomenclature ? Who first proposed plant nomenclature ? Mention the types of nomenclature. Write the basic differences between ICN and ICBN. $1 + 1 + 2 + 4$

14. What is biodiversity ? Who first proposed this term ? Mention the importance and levels of biodiversity. $1 + 1 + 6(3 + 3)$

15. Define conservation. What are *ex-situ* and *in-situ* conservation ? Write short notes on seed and pollen bank. $1+2+5(2\frac{1}{2}+2\frac{1}{2})$

16. What is herbarium ? Who first discovered herbarium ? What are the differences and significance of digital and traditional herbarium ? $1 + 1 + 6(3 + 3)$

**[ Internal Assessment – 10 Marks ]**

## PAPER – BOT-303B

( *Mycology* )

### GROUP – A

Answer any **four** questions from the following : $2 \times 4$

1. What are MTOCs ?
2. In which year penicillin was discovered and from which organism ?
3. What is spindle pole body ?
4. Give the full forms of MEN and SIN.
5. Define heterokaryosis.
6. How is vegemite prepared ?

### GROUP – B

Answer any **four** questions from the following : $4 \times 4$

7. Siderophore production.

8. Spindle pole body found in fungi and their function.

9. Itaconic acid.

10. Exogenous dormancy of fungal spores.

11. Roles of fungi in nutrient recycling.

12. Cyclosporin.

## GROUP – C

Answer any **two** questions from the following : $8 \times 2$

13. What are the salient features of heterokaryosis ? How does it arise ? 4 + 4

14. Write a note on Fumaric and Gluconic acid production. 4 + 4

15. Discuss about SCP obtained from fungi. Describe production of Quorn. 4 + 4

16. Write a note on the role of PSF. Describe the role of fungi as biofertiliser. 4 + 4

**[ Internal Assessment – 10 Marks ]**

## PAPER – BOT-303C

*( Cell Biology and Genetics )*

### GROUP – A

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

1. What are glycocalyx and cytoskeleton and their chemical nature ?

2. Mention some factors other than cyclin and cdk engaged in fine tuning of cell cycle.

3. Explain the chemical properties of membrane lipid responsible for its amphipathic nature.

4. How is p53 protein engaged in cell cycle regulation ?

5. How does breeders' concept of speciation differ from that of genetic view ?

6. How does the construction of telomere help serve its purpose ?

## GROUP – B

Answer any **four** questions from the following : $4 \times 4$

7. Elaborate narrow-sense heritability. Contrast it with broad-sense heritability.

8. Write a short note on quantum speciation.

9. Give a brief account of the roles played by cyclins and CDKs.

10. Which structural uniqueness help a centromere function and become heterochromatin in nature ?

11. Illustrate different behaviours of polygenes. What are minor genes and their specific roles ?

12. What is parental imprinting ? Give an overview of epigenetic regulation of trait.

## GROUP – C

Answer any **two** questions from the following : $8 \times 2$

13. Give a comprehensive account of the varieties of protein components of cell membrane. 8

14. Mention the criteria for sorting out 'B' chromosomes. Characterize 'B' chromosomes. Elucidate the origin of 'B' chromosome from 'A' chromosome. $2 + 4 + 2$

15. Compare Sympatric, Parapatric and Peripatric speciation. 8

16. Elaborate Hardy-Weinberg principle explaining constancy of allelic and genotypic frequency in a population. Illustrate different phenomena

derived in a situation where only 100 individuals from a population of 10,000 individuals raise another population. 6 + 2

**[ Internal Assessment – 10 Marks ]**

## PAPER – BOT-303E

( *Special Microbiology* )

### GROUP – A

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

1. Why gold coating is required for electron microscopy ?

2. What is interferon ?

3. What are toxoids ?

4. What is acid fast staining ?

5. What are prions ?

6. Give examples of two rickettsial diseases.

## GROUP – B

Answer any **four** questions from the following : $4 \times 4$

7. Write down the mechanism of action and applications of proteases.

8. Write down nodulation process of Leguminous plants.

9. Discuss different characters of Actinomycetes.

10. What are biofilms ? Mention its importance.

11. What are different mechanisms of drug resistance found in bacteria ?

12. Write down the process for cultivation of animal viruses.

## GROUP – C

Answer any **two** questions from the following : $8 \times 2$

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

(*i*) M 13

(*ii*) Topoisomerase.

**14.** (*a*) What are methanogens ? Give Examples of two methanogenic bacteria.

(*b*) Write down importance of continuous culture. $(2 + 2) + 4$

**15.** (*a*) What are oncogenes ? How proto-oncogene becomes activated ?

(*b*) How pH and Temperature regulates enzyme activity ? What is competitive enzyme inhibition ? $(2 + 2) + (2 + 2)$

**16.** Write notes on : 4 + 4

(*i*) Viroids

(*ii*) c-DNA library.

**[ Internal Assessment – 10 Marks ]**

## PAPER – BOT-303F

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

### GROUP – A

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

**1.** What is meant by erosion of rocks ?

**2.** What is unconformity ?

**3.** Differentiate sand from silt.

**4.** What is meant by lithostratigraphy ?

5. Name two megafloral elements of Dubrajpur formation.

6. What is meant by formation ? How does it differ from bed ?

## GROUP – B

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

7. What is meant by overturned bed ? Cite an example. What is geologic clock ?

8. Enumerate the miofloristics recovered from Barakar and Kulti formations.

9. Write down the megafloristics of Tiki and Hartala hill formations.

10. Discuss Triassic floras of Molteno formations.

11. Discuss the method of dating of rock samples using carbon as an element.

12. Describe the flora occurred during Mesozoic era.

## GROUP – C

Answer any **two** questions from the following : $8 \times 2$

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

14. Describe the megafloral succession of the world during Siluro-Devonian period. 8

15. Define stratigraphy. How stratigraphic deductions can be worked out of an area ? How plant fossil elements help to correlate among the different local sections of a given area ? $2 + 3 + 3$

16. Discuss different life-forms those are recovered from Precambrian strata. 8

**[ Internal Assessment – 10 Marks ]**

## PAPER – BOT-303G

( *Plant Physiology* )

GROUP – A

Answer any **four** questions from the following : $2 \times 4$

1. What is the basic difference between adaptation and acclimation ?

2. Mention two homologies of floral bud with vegetative bud.

3. Name one chloride halophyte and one alkaline halophyte.

4. What are cadastral genes ?

5. What is monocarpic senescence ? Give example.

6. What is meant by night break phenomenon ?

## GROUP – B

Write short notes on any **four** from the following : $4 \times 4$

7. HSP

8. Structure of adenylyl cyclase

9. ABC model of floral development

10. Role of vacuoles in PCD

11. Pathogen mediated hypersensitive response

12. Calmodulin.

## GROUP – C

Answer any **two** questions from the following : $8 \times 2$

13. What are the three main types of membrane bound receptors ? Describe in detail the mechanism of action of any one of them. $3 + 5$

**14.** What types of injuries plants face due to salinity stress ? Briefly discuss about the molecular mechanism of salt tolerance in plants. 3 + 5

**15.** Write about the photoperiodic pathway of floral induction in *Arabidopsis*. Explain how floral induction is regulated by FT. 4 + 4

**16.** What are SDGs and SAGs ? Schematically represent the model for regulatory pathways in floral senescence. 2 + 6

**[ Internal Assessment – 10 Marks ]**