

# COMBINED COMPETITIVE EXAMINATION (MAIN)

## BOTANY

### Paper—II

Time : 3 hours

Full Marks : 200

**Note :** (1) The figures in the right-hand margin indicate full marks for the questions.

(2) Attempt **five** questions in all.

(3) Question No. 1 is compulsory.

1. Answer any *ten* of the following :

4×10=40

- (a) Give the differences between autosomes and allosomes..
- (b) Differentiate between PS I and PS II.
- (c) "Water is a universal solvent." Explain.
- (d) Explain hydrogen bonding in water.
- (e) What are adhesive and cohesive forces?
- (f) Explain ascent of sap.
- (g) Differentiate between transcription and translation.
- (h) Differentiate between spontaneous and induced mutations.
- (i) Differentiate between Binomial distribution and Poisson distribution.
- (j) Differentiate between transpiration and guttation.
- (k) Differentiate between Northern and Southern hybridizations.
- (l) Differentiate between phototropism and photoperiodism.

2. Answer any *eight* of the following :

5×8=40

- (a) Explain why cultivated citrus plant species are thought to have originated in North-Eastern India.
- (b) Explain the term ecological niche.
- (c) Differentiate between photosystem I and photosystem II.
- (d) Write a short note on 'wobble hypothesis' with reference to genetic code.
- (e) Explain the functional difference between the two membranes found in mitochondria.
- (f) Explain the technique of gene cloning.
- (g) List the major forest types occurring in India.
- (h) Write a short note on physiology of fruit ripening.
- (i) Write a short note on nucleo-cytoplasmic male sterility.
- (j) Differentiate between numerical and structural variations in chromosomes.

3. Answer any *five* of the following :

8×5=40

- (a) What is paracentric inversion?
- (b) Explain 'operon' concept.
- (c) Differentiate between Lamarckism and Darwinism.
- (d) Differentiate between hybrids and cybrids. How are cybrids obtained?
- (e) Explain the role of diffusion in physiological processes in plants.
- (f) "Transpiration is a necessary evil." Explain.

4. Write notes on any *five* of the following in about 200 words each : 8×5=40

- (a) Crossing-over and its role in evolution
- (b) Seed dormancy
- (c) Social forestry
- (d) Pollution control

- (e) Tissue culture and its importance
- (f) Concept of 'standard error' and its application in various research programmes
- (g) Role of RNA in origin and evolution of life

5. Answer any *two* of the following :

20×2=40

- (a) Describe in detail the structure and functions of mitochondria.
- (b) Describe the use of male sterility in hybrid seed production.
- (c) What is Kranz anatomy? Where do you find it? Discuss its physiological importance.

6. Answer any *two* of the following :

20×2=40

- (a) Explain why temperate forests and woodlands are less productive and diverse than tropical forests.
- (b) Describe in detail the steps involved in synthesis of proteins. How does protein synthesis in prokaryotes differ from that in eukaryotes?
- (c) Write short notes on the following :
  - (i) Meiosis
  - (ii) Sex-linked inheritance
  - (iii) Multiple factors
  - (iv) Chi-squared test

7. Answer the following :

10×4=40

- (a) Explain the concepts of photoperiodism and vernalization. What is meant by critical photochemical requirement for plant growth and development? In this background, reexamine the photoperiodic classification of plants.
- (b) What is parthenocarpy? Discuss its application in agriculture.
- (c) What is oxidative phosphorylation? What is its significance?
- (d) What are biomes? Explain, with examples, how climate determines what biome occurs in a region.

8. With suitable diagrams, critically examine the various models of membrane systems in eukaryotic cells and state which one is the most suitable to explain the ultrastructure and functions of the system. 40
9. Differentiate between chromosomal aberrations and gene mutations. How do the spontaneous mutations arise and what is their role in evolution? 10+30=40
10. Differentiate between respiration and fermentation. Describe the biochemical events during the process of respiration. 10+30=40

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**COMBINED COMPETITIVE EXAMINATION (MAIN)**

**COMMERCE AND ACCOUNTANCY**

Paper—I

Time : 3 hours

Full Marks : 200

**Note :** (1) The figures in the right-hand margin indicate full marks for the questions.

(2) Attempt **five** questions in all.

(3) Question No. 1 is compulsory.

1. Answer any *ten* of the following questions :

4×10=40

- (a) What is job costing?
- (b) What is residential status?
- (c) What is fixed working capital?
- (d) Define risk.
- (e) What is setoff of loss?
- (f) What is vouching?
- (g) What is revenue expenditure?
- (h) What is margin of safety?
- (i) What is nonperforming asset?
- (j) What is a Treasury Bill?
- (k) What is financial structure?
- (l) What is a cost sheet?

2. Answer any *eight* of the following questions :

5×8=40

- (a) What is a development finance institution?
- (b) What is lease financing?
- (c) Explain, giving example, FIFO method of inventory management.