COMBINED COMPETITIVE EXAMINATION (MAIN)

BOTANY

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. (a) Distinguish between the following :   2×10=20

    (i) Bacteria and Viruses

    (ii) Bacteria and Cyanobacteria

    (iii) Homospory and Heterospory

    (iv) Pollinia of Asclepiadaceae and Orchidaceae

    (v) Xylem and Phloem

    (vi) Colony and Plaque

    (vii) Flower and Inflorescence

    (viii) Bacteriophages and Plasmids

    (ix) Genus and Species

    (x) Cymose and Racemose

  (b) Choose the correct option :   2×5=10

    (i) Plastids are absent in

      1. Cyanophyta

      2. Chlorophyta

      3. Rhodophyta

      4. Phaeophyta

(ii) Which of the following has prokaryotic cells?

  1. *Nostoc*

  2. *Ulothrix*

  3. *Sargassum*

  4. *Spirogyra*

(iii) Penicillin is produced by

  1. *Aspergillus*

  2. *Albugo*

  3. *Penicillium*

  4. *Spirulina*

(iv) The common term for Anthocerotaceae is

  1. stonewort

  2. liverwort

  3. thornwort

  4. hornwort

(v) Juvenile stage of *Funaria* gametophyte is

  1. sarconema

  2. protonema

  3. peristome

  4. apospore

(c) Explain any *five* of the following :   2×5=10

  (i) Apogamy

  (ii) Polyembryony

  (iii) Differences between homospory and heterospory

  (iv) Role of embryology in classification of angiosperms

  (v) Fermentation

  (vi) Sporocarp of *Marsilea*

  (vii) Secondary growth in *Pinus* stem

2. Answer any *eight* questions from the following :　　　　　　　　　5×8=40

   (a) Give an account of the application of algae in industry.

   (b) Mention the indirect uses of bryophytes.

   (c) Write a note on the evolution of sporophyte in bryophytes.

   (d) Describe the range of thallus in algae.

   (e) Comment on fungal toxins.

   (f) Write a note on the salient features of Cordaitales.

   (g) Explain the tunica corpus theory.

   (h) Give an account of pollen grain morphology and the application of palynology.

   (i) Explain the floral structure and primitive characters of Magnoliaceae.

   (j) Explain the term 'binomial nomenclature'.

3. Answer any *five* of the following :　　　　　　　　　8×5=40

   (a) Describe the types of ascocarps in Ascomycotina and illustrate how they help in classification.

   (b) Discuss the role of numerical taxonomy in systematics of angiosperms.

   (c) Write a detailed note on floral structure and floral formula of Poaceae.

   (d) Give the salient features of Bentham and Hooker system of classification.

   (e) Discuss the role of pigmentation and reserved food in the classification of algae.

   (f) Describe the mode of sexual reproduction in yeast.

4. Answer any *four* of the following :　　　　　　　　　10×4=40

   (a) Write on the gametophytic generations of *Gnetum*.

   (b) Discuss seed habit in pteridophytes giving suitable examples.

   (c) What are biosensors? Describe the applications of microbiology in industry.

(d) With the help of suitable diagrams, describe the structure and arrangement of sex organs in bryophytes.

(e) Write on the structure of flower and fruit in Leguminosae.

5. Answer any *two* of the following : 20×2=40

(a) What is heterotrichous habit in algae? Discuss its role in the evolution of terrestrial habit.

(b) Ovule-bearing organ of *Pinus* is a highly reduced shoot in the axil of bract. Discuss.

(c) Write a note on somatic hybrids.

6. Explain any *two* of the following : 20×2=40

(a) Blight disease of potato

(b) Tikka disease of groundnut

(c) Rust disease of wheat

7. Answer the following questions : 20+10+10=40

(a) What is biodiversity? Describe *in situ* and *ex situ* methods for conservation of biodiversity.

(b) Write an explanatory note on the advanced characters of Asteraceae.

(c) Write a detailed note on the structure of pollen wall.

8. What is double fertilization? With sketch diagrams, illustrate post-fertilization changes within the ovule of a dicot. 10+30=40

9. Answer the following : 20×2=40

(a) Describe the ultrastructure and role of heterocyst in blue-green algae.

(b) Discuss that mesosomes are artifacts and not true structures.

10. What are mycorrhizae? Describe the economic potential of mycorrhizal fungi in agriculture and forestry. 10+30=40

* * *