

Time : 3 hours

Full Marks : 200

**Instructions :**

- (1) Answer **all** questions following the directions.
- (2) The figures in the right-hand margin indicate full marks for the questions.

1. Differentiate between the following pairs (in about 30 words each) :

3×10=30

- (a) Chlorosis and necrosis
- (b) Spine and thorn
- (c) Vascular bundles of stems of dicotyledonous and monocotyledonous plants
- (d) Symptoms and syndromes
- (e) Eusporangiate and leptosporangiate sporangia
- (f) Plasmid and cosmid
- (g) *In situ* and *ex situ* conservation
- (h) Euploidy and aneuploidy
- (i) Apogamy and apospory
- (j) Backcross methods and multiple-cross methods

2. Write on the following (in about 30 words each) :

3×10=30

- (a) Management of Red rot disease of sugarcane
- (b) Structure of virus
- (c) Cytoplasmic inheritance
- (d) Clover model of tRNA
- (e) Special type of inflorescence
- (f) Peristome of mosses
- (g) GM crop
- (h) Gram stain
- (i) Heterospory with suitable examples
- (j) Hybrid vigour

3. Answer any *ten* of the following :

5×10=50

- (a) Write a note on biofertilizers.
- (b) Give an account on biodiversity hot spot areas of India.
- (c) Describe different protected areas of Arunachal Pradesh.
- (d) What are the principles of recent code of botanical nomenclature?
- (e) Describe briefly the bioenergetics of C<sub>3</sub> and C<sub>4</sub> pathways.
- (f) Describe in brief the haustorial structure of endosperms.
- (g) What are the significances of meiosis?
- (h) Illustrate the cellular organization of mitochondria.
- (i) Write about various medicinal uses of lichen.
- (j) Write an account on timber plants of N-E India and their uses.
- (k) Mention different ways adopted to remove seed dormancy.
- (l) Write briefly the most accepted theory regarding ascent of sap.
- (m) "Nature always favours cross-pollination." Explain.

4. Explain any *six* of the following (in about 50 words each) :

5×6=30

- (a) What are NTFPs? Whether mushrooms are NTFPs? Write botanical names of three NTFPs available in N-E India.
- (b) Define endemism and its various types. Write the name of five species endemic to N-E India.
- (c) Write very briefly the Bentham and Hooker systems of classification.
- (d) Describe operon concept of gene action.
- (e) Write about mycotoxins and their role in health hazard.
- (f) What are the different methods of biological control of plant diseases?
- (g) What are photosynthetic pigments? Mention their role in photosynthesis.
- (h) "Krebs' cycle is also known as TCA cycle." Explain.

5. Answer any *three* of the following (in about 100 words each) :  $10 \times 3 = 30$
- (a) Give an account on structure and function of secondary tissues of angiosperms.
  - (b) Discuss the role of isotopes in biological studies.
  - (c) Define sex determination in plants.
  - (d) Define microplan. What are the different components of a microplan?
6. Answer any *two* of the following (in about 150 words each) :  $15 \times 2 = 30$
- (a) Define agroforestry. Give a detailed account on agroforestry systems in N-E India.
  - (b) "DNA replication is semiconservative." Explain with neat diagram.
  - (c) Explain the role of palynology in taxonomy.
  - (d) Write various methods of cell tissue culture. How is it different from protoplast culture?

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