

Time Allowed : **Three Hours**

Maximum Marks : **200**

Question Paper Specific Instructions

Please read each of the following instructions carefully before attempting questions :

There are **EIGHT** questions in all, out of which **FIVE** are to be attempted.

Questions no. **1** and **5** are compulsory. Out of the remaining **SIX** questions, **THREE** are to be attempted selecting at least **ONE** question from each of the two Sections A and B.

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

All questions carry equal marks. The number of marks carried by a question/part is indicated against it.

Answers must be written in **ENGLISH** only.

SECTION A

Q1. Answer the following :

- (a) What is cell ? Enlist different organelles of plant cell with a brief description of mitochondria. 8
- (b) What do you mean by heterosis ? Describe the genetic basis of heterosis. 8
- (c) Describe the agronomic and genetic principles of quality seed production. 8
- (d) Explain in detail the Krebs cycle. 8
- (e) Explain the molecular marker approach in crop improvement. 8

Q2. Answer the following :

- (a) Describe the role of Cytoplasmic Genetic Male Sterility (CGMS) and Self-incompatibility (SI) systems in hybrid seed production. 15
- (b) What do you mean by vertical and horizontal resistance ? Give an account of basic principles behind these resistances. 15
- (c) What do you mean by conservation of plant genetic resources ? Explain their contribution in crop improvement in India. 10

Q3. Answer the following :

- (a) Distinguish between the following, giving suitable examples : $5 \times 3 = 15$
 - (i) Breeder seed and Certified seed 5
 - (ii) Natural selection and Artificial selection 5
 - (iii) Cytoplasmic and Cytoplasmic-genetic male sterility 5
- (b) Write the various methods of plant breeding. Describe backcross method with its importance in development of crop varieties. 15
- (c) Describe the role of mutation in development of disease resistant varieties of crops. 10

Q4. Answer the following :

- (a) Describe the various chromosome structural aberrations with the help of suitable diagrams and discuss their effects on organisms. 15
- (b) Describe various steps involved in seed certification. Give an account of institutions associated with the production of certified seeds in India. 15
- (c) Explain various mechanisms for water transport in plants. 10

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SECTION B

Q5. Answer the following :

- (a) Write down the physiological effects of auxin in plants. 8
- (b) Describe plug-tray technology for seedling production in vegetables. 8
- (c) Describe the principles of fruits and vegetables preservation. 8
- (d) Describe the major storage pests of pulses and their control measures. 8
- (e) Discuss the strengths and weaknesses of public food-grain distribution system in India.

Q6. Answer the following :

- (a) Describe the package of practices for 'papaya' cultivation in northern India. 15
- (b) Describe the incidence and management of 'leaf curl' and 'mosaic' virus diseases in 'Chilli' and 'Okra' crops. 15
- (c) Give a detailed account of constraints in sustaining the food-grain production in India. 10

Q7. Answer the following :

- (a) Differentiate between the following : $5 \times 3 = 15$
 - (i) Formal and Informal styles of gardens 5
 - (ii) Pollinator and Pollinizer 5
 - (iii) Insect vectors and Predators 5
- (b) Write a detailed note on incidence and management of fruit fly in 'cucurbits' and 'guava'. 15
- (c) Describe various factors for seed dormancy and methods for breaking the dormancy. 10

Q8. Answer the following :

- (a) Describe the year-round production technology of 'Chrysanthemum'. 15
- (b) Describe the production technology for off-season vegetables in India. 15
- (c) Discuss the integrated management practices for insect-pests and diseases in crops. 10

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