

AGRICULTURE

Paper II

(CONVENTIONAL)

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 chronological 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 Answer Book 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

- Q.1.** Attempt each question. 8×5=40
- (a) What mechanisms are involved in disease resistance ? Describe in brief gene-for-gene relationship. 8
- (b) Describe the role of various second messengers in signal transduction. Elaborate on crosstalk and its function in plant development. 8
- (c) Explain recurrent selection. Describe the specific purpose of recurrent selection for general combining ability. 8
- (d) Give the salient features of formal seed supply system. Outline the organizational set-up of Indian seed industry. 5+3=8
- (e) Define co-enzyme and iso-enzyme giving suitable examples. Briefly discuss the properties of enzymes. 4+4=8
- Q.2.** Answer the following : 10×4=40
- (a) What is allopolyploidy ? Describe in brief applications of allopolyploidy in crop improvement. 3+7=10
- (b) What are the advantages of using molecular markers in plant breeding ? Explain in detail different molecular markers. 6+4=10
- (c) What is the importance of transgenics in agriculture ? Describe various methods of gene isolation. 5+5=10
- (d) Explain how the flowering in plants has closer relationship with the period of exposure to light. Give examples of short day and long day plants. 6+4=10

- Q.3.** Answer the following : 10×4=40
- (a) Describe various phases of plant growth. How is growth measured ? 6+4=10
 - (b) Explain the distinct advantages and shortcomings of agrobacterium mediated and biolistic gene transfer techniques. 10
 - (c) How do enzyme catalyzed reactions differ from ordinary chemical reactions ? 10
 - (d) Explain marker assisted selection (MAS). 10

- Q.4.** Distinguish between the following : 10×4=40
- (a) Back cross and Dihybrid cross 10
 - (b) C₃ and C₄ photosynthetic pathways 10
 - (c) Totipotency and Micropropagation 10
 - (d) Lock and key model and Allosteric modulation 10

SECTION B

- Q.5.** Attempt each question. 8×5=40
- (a) Discuss the principles and methods of preservation of fruits and vegetables. 8
 - (b) What are the requirements of seed production ? Explain the importance of isolation distance in seed production of some important crops. 8
 - (c) Define seed dormancy. Discuss briefly the various methods for breaking seed dormancy. 8
 - (d) Write short notes on crassulacean acid metabolism (CAM). Mention at least two examples of CAM plants. 6+2=8
 - (e) Explain the significance of self-incompatibility and male sterility in the field of plant breeding. 8
- Q.6.** Distinguish between the following : 10×4=40
- (a) Synchrony in flowering and planting ratio of parents 10
 - (b) Monogenic traits and polygenic traits 10
 - (c) Gene pool and gene frequency 10
 - (d) Cyclic and non-cyclic electron transport of photosynthesis 10
- Q.7.** Answer the following : 10×4=40
- (a) Why is the characterization of germplasm resources available in crop species essential ? Give different levels at which germplasms are characterized. 2+8=10
 - (b) Explain in detail the fact that India has its own *sui generis* system of plant variety protection. 10
 - (c) Explain the requirements of certified seed. 10
 - (d) How can growth be distinguished from development ? Name the precursor aminoacids from which IAA and ethylene are synthesized respectively. Briefly discuss the physiological role of ethylene in plants. 2+2+6=10
- Q.8.** Answer the following : 10×4=40
- (a) Define Vernalization. What mechanism plays behind vernalization ? State its significance in agriculture. 2+4+4=10
 - (b) Name the national organizations involved in Indian seed industry. Explain in detail the role of public and private seed sectors in seed production in India. 3+7=10
 - (c) What do you mean by monophagous and polyphagous pests ? Give a concise note on pests of vegetables with particular reference to fruit flies. 2+8=10
 - (d) Give a brief account on the advantages and disadvantages of sexual reproduction in plants. 10