

AGRICULTURE (Paper II)

Time Allowed : Three Hours

Maximum Marks : 250

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

There are EIGHT questions divided in two Sections.

Candidate has to attempt FIVE questions in all.

Question Nos. 1 and 5 are compulsory and out of the remaining, any THREE are to be attempted choosing at least ONE question from each Section.

The number of marks carried by a question/part is indicated against it.

Wherever any assumptions are made for answering a question, they must be clearly indicated.

Word limit in questions, wherever specified, should be adhered to.

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.

SECTION 'A'

1. Answer the following in about 150 words each:

10×5=50

 - (a) “Aneuploids are generally weak, but they are useful in plant breeding”. Evaluate this statement in the light of available information.
 - (b) Explain the meaning of genetic purity of seed. Briefly describe the various approaches for testing genetic purity of seed.
 - (c) “Heterosis is observed in both self and cross-pollinated crops, but hybrid varieties are more common in cross-pollinated crops”. Comment on this statement on the basis of relevant information.
 - (d) Briefly describe the procedure for utilization of induced mutation in plant breeding.
 - (e) Highlight the various contributions of inter-specific hybridization in crop improvement.
2.
 - (a) Discuss the role of National Seeds Corporation in quality seed production in India. **12.5**
 - (b) Define pureline. Discuss the relevance of pureline selection in self- and cross-pollinated crops. **12.5**
 - (c) Explain the use of cytoplasmic-genetic male sterility in hybrid seed production. **12.5**
 - (d) Why do quantitative traits show continuous variation? **12.5**
3.
 - (a) Discuss the relevance of mode of reproduction in plant breeding. **12.5**
 - (b) DNA is the genetic material. How does DNA contribute to the development of various traits? **12.5**
 - (c) Define general combining ability. Describe the procedure for recurrent selection for general combining ability. **12.5**
 - (d) What is plant disease epidemic? Why do disease epidemics occur? How can they be managed? **12.5**
4. Write notes on the following:

12½×4=50

 - (a) TRIPS Agreement
 - (b) Somaclonal variation

- (c) Gene cloning and development of transgenics
- (d) Gene Banks

SECTION 'B'

5. Answer the following in about 150 words each:

10×5=50

- (a) What are the fundamental difference between transpiration and guttation? In a winter morning, water droplets might be noticed on some plant leaves. How could it be ascertained whether the water droplets were those of dew drops or guttation water?
 - (b) What is meant by 'sigmoid' growth curve? Draw and describe a sigmoid growth curve citing its different phases.
 - (c) Show full reactions where (i) Alcohol dehydrogenase, (ii) Nitrate reductase, (iii) Glucokinase and (iv) Succinate dehydrogenase are involved, therewith mentioning respective co-factor, co-enzyme, prosthetic group etc., if so required.
 - (d) Differentiate between incipient wilting, temporary wilting and permanent wilting. Classify different types of droughts and mention how are they related to each other.
 - (e) Write short note on Hill reaction. Prove that O₂ evolved during photosynthesis comes from water and not from CO₂.
6. (a) Define vernalization. How vernalization is activated in plants? Briefly discuss its importance in agriculture. 12.5
- (b) Name the causal agent of black Sigatoka disease of banana. Enumerate the diagnostic symptoms of the disease. Suggest remedial measures to control the disease. 12.5
- (c) Give an account of different types of water present in soil. 12.5
- (d) Enumerate objectives of Integrated Child Development Service Scheme. 12.5
7. (a) Explain in brief Targeted Public Distribution System (TPDS). What measures have been taken to increase transparency in the functioning of TPDS. 12.5
- (b) Describe India's food security system. Enumerate reasons for disturbance in food demand and supply. 12.5
- (c) What are the key determinants of malnutrition? What major initiatives have been taken to improve nutritional status of Indian population? 12.5
- (d) Briefly discuss handling methods for export of mango. 12.5
8. (a) Describe the principles and practices of plant quarantine. Can import quarantine be exempted by submitting a phytosanitary certificate issued by the government of the exporting country? Also, are disinfestations of planting material in the exporting country prior to importation or disinfestations in transit performed on the high seas considered to fulfil the requirements for quarantine inspection? 12.5
- (b) What is a pesticide formulation? Differentiate active ingredient from inert ingredient. Give at least two examples each of active and inert ingredients. 12.5
- (c) Define jelly. Explain the principle of jelly formation. Briefly describe the preparation of jelly and enumerate problems in jelly making. 12.5
- (d) What is meant by protective cultivation? Briefly discuss importance of greenhouse in protective cultivation. 12.5