

If the questions attempted are in excess of the prescribed number, only the questions attempted first up to the prescribed number shall be valued and the remaining ones ignored.

Answers may be written either in English or in Bengali but all answers must be in one and the same language.

Answer any three questions from Group-A and two questions from Group-B

Group - A

1. Answer any four of the following.

- (a) i) What is hairy root culture ?
 ii) What are elicitors ?
 iii) Differentiate between paracentric and pericentric inversion.
 iv) What is biotransformation ?
 v) What is the difference between transformation and transduction? 2x5
- (b) i) Explain why DNA is alkali stable but RNA is alkali labile.
 ii) What is maternal inheritance ?
 iii) Distinguish between double tetrasomy and tetrasomy.
 iv) What is translocation ? How does it differ from inversion ?
 v) Distinguish between lethal mutation and misseuce mutation. 2x5
- (c) Distinguish between the terms haploidy and monoploidy. How can haploids be produced and utilized in plant breeding ? 2+8
- (d) What are plasmids ? What characteristics of plasmids made them suitable for cloning ? Describe the plasmid mediated gene transfer. 2+2+6
- (e) What do you mean by heterosis? Discuss the causes and utilization of heterosis. 2+2+6

2. Answer any four of the following.

- (a) Write a brief note on the enzymes involved in eukaryotic DNA synthesis. Establish that genetic code is universal and non-overlapping. What is Wobble hypothesis ? 5+2½+2½
- (b) What is linkage ? What are the types of linkage ? What are the observations of Bateson and Punnet? How did Morgan explains ? 2+2+2½+3½
- (c) What is polyploidy ? How does it help in evolution. 4+6
- (d) What is the difference between anther culture and pollen culture ? Can you describe the steps of induction of somatic embryogenesis. 4+6
- (e) i) What is meristeming and mericloneing ?
 ii) What are the main types of RNA polymerase ?
 iii) What is artificial seed ?
 iv) What is epistasis ? Describe with a checker board. 2+2+2+(2+2)

P.T.O.

3. Answer any four of the following.

- (a) What is polar transport of IAA? What is the mechanism of IAA transport and describe the steps of the biosynthesis of non-indole auxins. Describe the role of IAA in phototropism. 2+2+4+2
- (b) What are chromosomal aberrations? Describe their meiotic behaviours. What is their significance in evolution? 2+4+4
- (c) What is gene mutation? How can it be detected? Discuss its role in evolution. 2+4+4
- (d) Discuss the theories or concepts of organic Evolution explaining the origin of living organisms. 10
- (e) Discuss the different isolating mechanisms available in nature. 10

4. Answer any four of the following.

- (a) What are the carboxylations and reductions phases of C_3 photosynthesis? Schematically represent Kreb's cycle mentioning the enzymes of each step and the site of decarboxylation. 4+6
- (b) Give an elementary idea about the method of protoplast culture. Describe the application of biotechnology in the benefits of human beings. 4+6
- (c) What is DNA Taq polymerase? What is the role of reverse transcriptase in the synthesis of CDNA. Discuss the differences between fats and oils. Distinguish between saturated and unsaturated fatty acids. 2+3+2+3
- (d) What are transposable elements? Write about the mechanism of transposition in prokaryotes. 2+8
- (e) Explain the role of potassium in stomatal movement and explain the term critical day length. How does phytochrome help in flowering? 2+2+6

Group-B

5. Answer any four of the following

- (a) What are plant hormones? What are the functions of ethylene as a growth regulator? Mention the most important and useful methods that are used in plant breeding. 2+2+6
- (b) What is biological nitrogen fixation. Describe the steps in pathway of N_2 fixation in asymbiotic organisms. 4+6
- (c) What is Direct Oxidation pathway? Mention the steps of this pathway mentioning the enzymes and the products produced. 2+8
- (d) Describe the steps of the biosynthesis of gibberellins. What do you understand by CAM plants. What is the significance of CAM? 6+2+2
- (e) What is 'crude drug'? Mention the pharmacologically active constituents of Ipecac, Adhatoda, Zingiber and Curcume. What are the uses? What are adulterants? 1+3+3+3

6. Answer any four of the following.

- (a) Differentiate between Pribnow Box and Shine Dalgarno sequence. Compare the mutagenic effects of an alkylating agent and base analogue. What is thymine dimer? 2+2+4+2
- (b) What is cell cycle? What is MPF? What is aminoacylation of tRNA. How does it help in synthesis of a polypeptide? 2+2+2+4
- (c) The presence of glucose in the medium along with lactose leads to catabolite repression. Explain why catabolite repression is considered to be a form of positive control, while repression by the lac repressor is considered to be a form of negative control. 10
- (d) What is the difference between gene silencing and gene impuniting? 5+5
- (e) Describe the structure and composition of a ribosome. Discuss the functions of the sub-units. 5+5

7. Answer any four of the following.

- (a) How is transcription initiated, elongated and terminated in bacteria? 10
- (b) What is 3 point test cross? How can you map a gene by 3-pt test cross? 10
- (c) Write the principles of the following :-
i) Blotting
ii) PCR
iii) RFLP 2½x4
iv) RAPD
- (d) What is sematic hybridization? Mention its applications. 2+6
- (e) Write the major differences between plant breeding and genetic engineering. What are molecular markers? 5+5