

2015

BOTANY

[Honours]

PAPER – VI

Full Marks : 90

Time : 4 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP – A

1. Answer any *ten* from the following : 2 × 10
- (a) What is centimorgan ?
 - (b) What is non-reciprocal translocation ?
 - (c) What is resolving power of a microscope ?

- (d) What are microtubule associated proteins ?
- (e) State the significance of 'cos' site of λ phage.
- (f) What is C-mitosis ?
- (g) Distinguish between bio-fertilizer and compost.
- (h) Why is "test cross" called so ?
- (i) Write the full forms of 'NCBI' and 'BLAST'.
- (j) What is the adaptive advantage of polyploidy ?
- (k) Compare cutting and grafting.
- (l) Define centromeric index.
- (m) Mention the roles of cryoprotectants with two examples.
- (n) State two advantages of using transgenic crops.
- (o) What is the use of EDTA in plant tissue culture medium ?

GROUP – B

2. Answer any *five* from the following : 8 × 5

(a) What is cytoskeleton ? Describe different types of eukaryotic cytoskeleton. Mention the significance of cytoskeleton. 2 + 3 + 3

(b) What is sputter coater ? Why biological materials are required to be coated with noble metal prior to viewing through the electron microscope ? State the working principle of SEM. 2 + 3 + 3

(c) Write short notes on : 4 + 4

(i) Cyclins and cdks of cell cycle

(ii) Solenoid model of chromatin.

(d) What is meant by quantitative genetics ? How do multiple alleles differ from multiple factors ? Name two common traits of plants under the polygenic control. 3 + 3 + 2

(e) "Mutations are spontaneous and non-adaptive" – Explain. Briefly state the mode of functioning by telomerase. 5 + 3

- (f) What does it mean by semiconservative replication of DNA ? Explain this nature of replication in the light of the experiment of Meselson and Stahl. Name the enzymes involved in DNA replication and state their roles. 2 + 3 + 3
- (g) Define "variation" mentioning different types of it. Mention the equation of Chi-square test with the necessary elaboration of the abbreviations used. What are degree of freedom and level of probability ? 3 + 3 + 2
- (h) Define totipotency and state its utility. What are embryoids and how does it differ from embryo ? What specific chemical reaction does help in preparing synthetic seeds ? Name the propagules usually used in it. 2 + 3 + 3

GROUP – C

3. Answer any *two* of the following : 15 × 2
- (a) Draw and mention the structure of P^{BR322} showing the position of marker gene on it.

Mention the use of recombinant DNA in medical science. How does polypeptide chain elongation occur in prokaryotes? Prove the DNA as a genetic material with the help of an experiment. 4 + 3 + 4 + 4

(b) Compare the natural and synthetic seeds. How is synthetic seed prepared? Mention two ways of proving the viability of protoplast. Define heterosis. How can it be fixed? Illustrate over-dominance hypothesis of heterosis. 2 + 3 + 2 + 2 + 3 + 3

(c) (i) Define germplasm with four examples from plant. What are meant by dedifferentiation and redifferentiation? What is the significance of xylogenesis? State the principle and procedure of cryopreservation. 2 + 2 + 1 + 4

(ii) What is embryo rescue? Mention its necessity and significance. 3 + 3

- (d) (i) Define bioinformatics and elaborate its objectives and working principle. Give a brief account of the uses of this field of study. 5 + 3
- (ii) Draw and describe the structure of a typical tRNA. Explain the reciprocal and non-reciprocal translocations. 4 + 3
-