

2016

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) Explain the degeneracy of genetic code with an example.
  - (b) How does Z-DNA differ from B-DNA ?

( Turn Over )

- (c) Mention the functions of endoplasmic reticulum.
- (d) Distinguish between karyogram and idiogram.
- (e) What are recon and cistron ?
- (f) Mention the differences between Missense and Nonsense Mutations.
- (g) What are segmental allopolyploidy and amphidiploidy ?
- (h) What is MTOC ? State its function.
- (i) State a condition in which the values of mean, median and mode are same for a data set.
- (j) Name two transgenic crops with their beneficial aspects.
- (k) Mention four ideal characters of a cloning vector used in genetic engineering.
- (l) Mention two advantages and disadvantages of layering.

- (m) Point out the part of a T-DNA responsible for transposition.
- (n) How is the kernel of a nucleosome constituted of ?
- (o) Define cybrid. State its significance.

GROUP – B

2. Answer any *five* from the following :  $8 \times 5$

- (a) What is Karyotheca ? Give a brief account of nuclear membrane and its associated structures. Define nucleosome with its ultrastructure.  $1 + 4 + 3$
- (b) Define allopolyploidy with suitable example. State its significance in evolution. What is trisomic ?  $3 + 3 + 2$
- (c) State the basic principle of chromosome banding. Distinguish between G-banding and Q-banding. Comment on different applications of this technique.  $2 + 3 + 3$

- (d) Give two examples of double stranded nature of RNA. Briefly state Taylor's experiment to prove semiconservative replication of DNA. Write a comprehensive note on the molecular basis of recombination.  $2 + 3 + 3$
- (e) Distinguish between apomixis and parthenogenesis. How does diploid parthenogenesis differ from haploid one? Define apogamy and apospory with suitable examples.  $2 + 4 + 2$
- (f) Define central tendency. Give a comparative account of mean, median and mode of a data set. State the significance of standard deviation and standard error.  $2 + 4 + 2$
- (g) What is genomic library? How is this library constructed and maintained? Describe molecular farming.  $2 + 3 + 3$
- (h) Define organogenesis in *in vitro* culture of plant. Enlist the basic macro and micro nutrients used in plant tissue culture media. What is somaclonal variation? Mention its significance.  $2 + 3 + 1 + 2$

GROUP - C

3. Answer any *two* of the following : 15 × 2

(a) State the working principle of phase contrast microscopy. Mention the fields of its application with reasons. Give a general account of the ultrastructure of cell membrane. Comment on the selective permeability of cell membrane. 5 + 2 + 5 + 3

(b) Why 'three point test cross' is required for constructing linkage map? What is complete and incomplete linkage? Define linkage group? Give example. Cytologically prove the occurrence of crossing over in maize. 5 + 2 + (1 + 1) + 6

(c) (i) What is tautomerization? Describe an experiment to detect sexlinked lethal mutation in *Drosophila*. 1 + 7

(ii) Explain the negatively regulated gene expression in *E. coli*. 7

( 6 )

- (d) (i) What is recalcitrance in callus culture of plant? Enumerate different fields of application of callus culture along with their significance. 1 + 5
- (ii) What is DNA probe? Define bioassay. 2 + 2
- (iii) Mention the role of mycorrhiza in soil. 5
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