

2017

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

[NEW SYLLABUS]

GROUP – A

1. Answer any *ten* for the following :

2 × 10

(a) What are auto and allopolyploidy ?

- (b) Enumerate the basic features of phase contrast microscope.
- (c) What is MPF ?
- (d) Write down the significance of polyploidy. Give an example.
- (e) What is null hypothesis ? Give an example.
- (f) What is marker gene ? Give an example.
- (g) Characterize restriction endonuclease. Give an example.
- (h) Mention the features of transposons.
- (i) State the differences between euchromatin and heterochromatin. Give an example.
- (j) What is inhibitory gene action ?
- (k) What are solenoid and nucleosome ?
- (l) Mention the functions of nuclear organizer region (NOR).

- (m) What is standard error? How it is calculated?
- (n) What is semiconservative replication?
- (o) Mention the differences between incomplete dominance and co-dominance. Give an example.

GROUP – B

2. Answer any *five* from the following : 8 × 5
- (a) Name two of each DNA and protein databases. Write any two differences between global and local alignment. Correlate three terms genome, genomics and proteomics. 2 + 2 + 1 + 3
- (b) Describe how 5-Bromouracil and Nitrous acid acts as a chemical mutagen to DNA. Mention any two exception of genetic code. Describe structure of a typical IS element. 3 + 2 + 3
- (c) Describe the genetic basis of heterosis. What are the different effects of inbreeding

depression ? What is callus ? What do you mean by one-gene-one enzyme (polypeptide) concept ?

2 + 2 + 2 + 2

(d) Mention the unusual bases in t-RNA. Write any three differences among A, B and Z DNA. Describe the structure of a t-RNA molecule.

1 + 3 + 4

(e) Differentiate between the working principle of scanning and Transmission Electron Microscopy (TEM). Name two fluorescence dyes used in fluorescence microscope.

3 + 3 + 2

(f) Discuss the applications of *Rhizobium* and *Azolla* as biofertilizer. Mention four properties of pBR322 as a cloning vector.

5 + 3

(g) Write down the techniques involved in embryo culture and its importance. Mention applications of micro-propagation.

3 + 2 + 3

(h) Define an Ideotype. Mention the characteristic of a crop ideotype. What is pure line selection.

2 + 4 + 2

GROUP - C

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

(a) What is transposable elements ? Write any four examples. Describe the experiment performed by Mc Clintock in maize for Ac-Ds elements. Write a brief note on cell cycle check points along with a suitable diagram. $2 + 2 + 5 + 6$

(b) Mention the differences between missense and nonsense mutation. Draw the genes associated with lac operon and describe the positive control of lac operon. Write the principle of phase contrast microscopy. How is it different from a fluorescence microscope. $2 + 7 + 3 + 3$

(c) (i) Write down the features of p^{BR322} . Mention the function of DNA ligase in biotechnology.

(ii) Write down the ideotype characteristics of rice and senflower $5 + 2 + 8$

(d) (i) Write the component of MS medium. What is protoplast culture ? Mention briefly the applications of protoplast culture.

(ii) What is split gene concept ? Discuss the matter in briefly. 3 + 2 + 3 + 3 + 4
