

2022

BOTANY

(Honours)

Paper Code : VII - A & B

(New Syllabus)

Full Marks : 80

Time : Four Hours

Paper Code : VII - A

(Marks : 16)

Choose the correct answer.

Each question carries 1 Mark.

1. The chromosome end is called —
 - (A) Telomere
 - (B) Centromere
 - (C) Satellite
 - (D) None of the above
2. F_2 phenotype ratio for dominant epistasis is —
 - (A) 1 : 2 : 1
 - (B) 9 : 3 : 4
 - (C) 12 : 3 : 1
 - (D) 9 : 3 : 3 : 1
3. Somatic hybridization is achieved through —
 - (A) Grafting
 - (B) Conjugation
 - (C) Callus induction
 - (D) Protoplast fusion
4. When a cell moves away from the cell cycle and enters into a quiescent stage, then that phase is called —
 - (A) G_2
 - (B) G_1
 - (C) G_0
 - (D) S

5. When 'n' is an odd number then median is defined as —
- (A) Middle value
 - (B) Median of two middle values
 - (C) Sum of the values
 - (D) Most repeated value
6. Polyploidy is induced through —
- (A) Irradiation
 - (B) Mutagenic chemicals
 - (C) Ethylene
 - (D) Colchicine
7. Endomitosis is found in —
- (A) Polytene chromosome
 - (B) Lampbrush chromosome
 - (C) B-Chromosome
 - (D) Both (A) and (B)
8. The restorer gene is present in —
- (A) Mitochondria
 - (B) Cytoplasm
 - (C) Cytoplasm and nucleus both
 - (D) Nucleus
9. Histones are made up of —
- (A) Tryptophan
 - (B) Lysine
 - (C) Arginine
 - (D) Both (B) and (C)
10. In the overlapping gene concept, one or two bases in a codon are utilized by —
- (A) Single reading frame of a gene
 - (B) More than one reading frame of a gene
 - (C) More than one reading frame of more than one gene
 - (D) None of the above

11. Emasculation is required for —
- (A) Selective hybridization
 - (B) Natural hybridization
 - (C) Self-pollination
 - (D) Pure lines
12. Which of the following histone is absent in the histone core?
- (A) H2A
 - (B) H4
 - (C) H1
 - (D) H2B
13. What is the probability of getting 3 when throwing dice once —
- (A) $1/6$
 - (B) $2/6$
 - (C) $3/6$
 - (D) 1
14. If one event is unaffected by the outcome of another event, the two events are said to be —
- (A) Dependent
 - (B) Independent
 - (C) Mutually exclusive
 - (D) All the above
15. The crossing of F1 hybrid to the homozygous recessive is called-
- (A) Back cross
 - (B) Test cross
 - (C) MI cross
 - (D) All of the above
16. In biostatistics, a group of individuals taken for study is called -
- (A) block
 - (B) population
 - (C) group
 - (D) flock

Paper Code : VII - B

(Marks : 64)

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their
own words as far as practicable.*

Group - A

1. Answer any *three* of the following : 4×3=12
- (a) What is Robertsonian Translocation? What is the result of such kind of translocation? 2+2=4
- (b) Briefly discuss the function of rough Endoplasmic Reticulum. 4
- (c) Mention the roles of cyclin-B in different stages of the cell cycle. 4
- (d) Briefly describe the structure of “Nucleosome Core” with a suitable diagram. 4
- (e) Write a short note on the Polytene chromosome. 4
2. Answer any *two* from the following : 10×2=20
- (a) What do you mean by Inversion? Differentiate between paracentric inversion with Pericentric inversion with suitable diagrams. What do you mean by Amphidiploidy? 2+3+3+2=10
- (b) Describe the ultrastructure of the nuclear envelope with labeled diagram. Briefly mention the functions of Golgi bodies. 7+3=10
- (c) Define cell cycle. What are the different stages of a cell cycle? Where are the major checkpoints located in the cell cycle? Describe the role of Cyclins in cell cycle regulation. 2+2+2+4=10
- (d) Write short notes on : 5+5
- (i) Maternal inheritance controlled by organelle DNA.
- (ii) Microtubule organization during cell division.

Group - B

1. Answer any *three* of the following : 4×3=12
- (a) State the Hardy-Weinberg principle. What is random genetic drift? 2+2
- (b) Describe the phenomenon of dominant epistasis with an example. 4
- (c) What is the chi-square test? Mention its significance. 1+3=4
- (d) How does linkage differ from independent assortment ? 4
- (e) Differentiate between mass selection and pure line selection. 4

2. Answer any *two* from the following : 10×2=20

(a) Define crossing over. How does it differ from linkage? Give an account of the molecular basis of genetic recombination with labelled diagrams (Holliday Model).
(2+2+6=10)

(b) What is heterosis? Give an account on the dominance and overdominance hypothesis to explain the genetic basis of Heterosis.
2+8=10

(c) In a three-point test cross (ABC/abc X abc/abc), the following data were obtained

ABC-230	ABc-138
abc- 240	abC-142
aBC-96	aBc-12
Abc-104	AbC-8

Find out the correct linear order of genes and prepare a genetic map. Calculate the coefficient of Coincidence and Interference.
8+2=10

(d) From a field of garden pea plants, random samplings of 13 plants were made. Their height in centimeters (cm) are as follows : 161, 183, 177, 157, 181, 176, 180, 162, 163, 174, 179, 169, 187. Calculate Mean, Standard Deviation, Standard Error and Coefficient of Variance.
2+4+2+2
