

[Time: $2\frac{1}{2}$ Hours]

[Marks : 75]

Please check whether you have got the right question paper.

- N.B:
1. Attempt all questions.
 2. All questions carry equal marks
 3. Draw neat labelled diagrams wherever necessary

1. Do as directed:- (any fifteen)

- Define gene.
- Define test cross.
- The ratio for dominant epistasis is _____.
- _____ in humans is an example of multiple alleles.
- Explain the term Punnett square.
- State True or False: - A homozygous individual could have a Bb genotype.
- State True or False: - The phenotypic ratio of 1:2:1 in *Mirabilis* plant is due to incomplete dominance.
- In Mendel's initial experiments, an example of the F₂ generation would be _____.
 - 75 round seed plants to 25 wrinkled seed plants
 - 75 green seed plants to 25 yellow seed plants
 - 75 white-flowered plants to 25 purple-flowered plants
 - all of the above
- Define Auxotroph.
- Define Prophage.
- State True or False: - In a HFr x F⁻ cross the frequency of transfer of F factor is low.
- State True or False: - Lambda bacteriophage is normally involved in transduction of the genes for histidine synthesis and ampicillin resistance in bacteria.
- Give one term for: Fertility factor containing bacterial genes.
- In bacteria, the entire chromosome can be transferred by the process of _____.
(transformation/ transduction/ conjugation).
- _____ can cause induction of lysogenic bacteriophages to lytic cycle.
(infrared light/ ultra violet light/ visible light).
- Define gene flow.
- _____ involves the flow or movement of alleles among the population.
- _____ frequency is calculated by counting the number of individuals with a particular genotype divided by the total number of the individuals in the population.
- Give the full form of PAGE.
- Explain the term: Population Genetics.

(TURN OVER)

- Q 2 a) Explain with a suitable example Duplicate recessive epistasis. 08
- Q 2 b) Illustrate monohybrid cross to elaborate on the principle of dominance and segregation 07
- OR
- Q 2 c) Draw Punnett square for a cross between Rose shaped comb pattern and Pea Shaped comb pattern to obtain F1 progenies with Walnut shaped comb phenotype. These F1 progenies were selfed to obtain F2 progenies with walnut, rose, pea and single comb shape pattern in fowls. What was the phenotype ratio for these four phenotype? Comment on the ratio obtained. 08
- Q 2 d) State and Explain the principle of Independent assortment citing a suitable example of a dihybrid cross. 07
- Q 3 a) Illustrate life cycle of temperate phages with one example. 08
- Q 3 b) Describe the process of transformation and add a note on its significance in mapping 07
- OR
- Q 3 c) Explain the process of progressive genetic transfer and recombination in bacteria by conjugation of HFr & F⁻ strains. 08
- Q 3 d) Compare and contrast between generalized and specialized transduction. 07
- Q 4 a) How are the genetic variations determined at DNA level using restriction enzymes? 08
- Q 4 b) Discuss in detail Genetic Drift. 07
- OR
- Q 4 c) State Hardy-Weinberg's law and Discuss in detail the assumptions of Hardy-Weinberg's law. 08
- Q 4 d) How would you compute genotypic and allelic frequencies? 07
- Q 5 Write short notes on any three of the following : 15
- Multiple alleles.
 - Incomplete dominance.
 - Significance of F Factor.
 - Natural selection.
 - Role of Population genetics in Conservation Biology.