

1. Attempt all questions.
2. All questions carry equal marks.
3. Draw neat labeled diagrams wherever necessary.
4. Use of log tables and non-programmable calculator is allowed.
5. For Q.2, Q.3 and Q.4 attempt A and B OR C and D.

Q. 1 Do as directed (Any fifteen)

15

1. A cross between true-breeding strains of peas involving only a single trait is a _____ cross.
2. When one allele of a gene is not completely dominant to another allele of the same gene, it is said to be _____ dominance.
3. The ratio of duplicate dominant epistasis is _____.
4. State true or false: A single diploid individual can have only a maximum of two of the multiple alleles.
5. Explain the term Punnett square.
6. Define Genotype.
7. Define Merozygote.
8. Define Temperate phage.
9. The recipient bacteria are most competent for transformation during _____ (early logarithmic phase/ late logarithmic phase / stationary phase)
10. The mechanism which triggers temperate bacteriophages to enter lytic cycle is termed as _____. (Transformation/Induction/ Conjugation)
11. State true or false: Phenomenon of transduction was discovered by interrupted mating experiment in Bacteria.
12. Give the term for Bacterial mutants with nutritional deficiency
13. Give the term for a genetic recombination process through uptake of naked DNA by suitable bacteria.
14. Define Population genetics.
15. When a mutant phenotype undergoes mutation at the same loci to give wild type phenotype the mutation is _____ mutation.

16. Calculate proportion of polymorphic loci for a population of 50 green frogs wherein 20 were polymorphic.
17. Give the full form of PAGE.
18. Give an example of a restriction enzyme.
19. State true or false: Migration involves migration of organisms from one location to another.
20. _____ is a type of genetic drift in which population is drastically reduced in size. (bottleneck effect, founder effect)

Q. 2 A True breeding homozygous tall plant with yellow seeds was crossed with true breeding short plant with green seeds. All the F₁ progeny were tall yellow. Using Punnett square method obtain the phenotypic and genotypic ratio of for following crosses: **08**

TtYy X ttyy

TtYy X TtYy

Q. 2 B What is epistasis? Explain Recessive epistasis with an example. **07**

OR

Q. 2 C Elaborate on the inheritance of multiple alleles with a suitable example. **08**

Q. 2 D Discuss the law of dominance and law of segregation using a monohybrid cross. **07**

Q. 3 A Give significance of 'Hfr strain' in bacteria. Illustrate the process of conjugation between Hfr and F⁻ bacterial strains. **08**

Q. 3 B What is generalized transduction? Illustrate the mechanism of generalized transduction giving an example. **07**

OR

Q. 3 C Compare and contrast between lysogeny and lytic cycle of bacteriophages. **08**

Q. 3 D Illustrate Griffith experiment on 'transforming principle'. **07**

Q. 4 A State Hardy Weinberg's law and give its assumptions. **08**

Q. 4 B Discuss with example the theory of Natural selection. **07**

OR

Q. 4 C How would you compute Genotypic frequencies and Allelic frequencies? **08**

Q. 4 D With reference to population genetics elaborate on genetic drift. **07**

- Q. 5** Write Short notes on any three of the following
- Effect of environment on gene expression.
 - Incomplete dominance.
 - Restricted transduction.
 - Bacterial transposable elements.
 - Role of population genetics in conservation biology.