

N.B:

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 calculators 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. Define genotype.
2. Who is considered as a father of modern genetics?
3. Name any two pairs of traits of pea plant which Mendel studied for his experiment.
4. Individuals that contain two copies of the same specific allele of a particular gene are said to be _____. (Homozygous, Hemizygous, Heterozygous)
5. Write down the phenotypic ratio of dihybrid cross.
6. Define transmission genetics.
7. State True or False: Flower color in the snapdragon plant is an example of incomplete dominance.
8. Define prototroph.
9. If a bacteria is not able to synthesize leucine, able to synthesize glutamate and able to metabolize lactose then the genotype will be represented as _____.
($leu^+ glu^+ lac^+$, $leu^+ glu^- lac^-$, $leu^- glu^+ lac^+$, $leu^- glu^- lac^-$)
10. Define Lysogeny.
11. What is a minimal medium?
12. _____ strains originate by a rare event in which the F factor integrates into the bacterial chromosome. (Nfr, Hfr, Pfr, Dfr)
13. Plasmids such as F that are also capable of integrating into the bacterial chromosome are called as _____. (Isosome, Isotopes, Exosomes, Episomes)
14. _____ is a branch of genetics which deals with the genetic variation within and among the populations.
(Darwinian genetics, population genetics, molecular genetics)
15. If 46% of the population have brown hair, then what is the frequency of the people in the population who do not have brown hair? (4.6, 0.54, 5.4)

16. Write any one method to calculate Allele frequency.
17. Which of the following statements is false about Hardy-Weinberg law?
- The population should be infinitely large.
 - Change in the genotype would result in change in allele frequency.
 - Population should be the Mendelian population.
 - There is no relation between evolution and natural selection.
18. Which of the following is a type of speciation? (Temporal, prezygotic, peripatric)
19. The sum of genotype frequencies equals to ____? (0,1,2)
20. Hardy-Weinberg law has a set of ____ assumptions. (4,5,6)
- Q 2 A Write a short note on how different environmental factors will affect the phenotype of the gene. 08
- Q 2 B Explain what is pedigree analysis? Summarize and explain all the basic symbols used in pedigree analysis. 07
- OR
- Q 2 C In jimsonweed, purple flower (P) is dominant to white (p), and spiny pods (S) are dominant to smooth (s). In a cross between a jimsonweed homozygous for purple flower (P) and spiny pods (S) and homozygous for white flower (p) and smooth pod (s), determine the phenotype and genotype of F₁ and F₂ generation with the help of dihybrid cross and explain law of independent assortment. 08
- Q 2 D Explain probability and their rules and represent the monohybrid cross with the help of a branch diagram. 07
- Q 3 A Explain the process of conjugation. 08
- Q 3 B Give an account of Transformation 07
- OR
- Q 3 C Give an account of the Lederberg and Tatum's experiment which provided evidence of conjugation. 08
- Q 3 D Explain the Lytic cycle of bacteriophage. 07
- Q 4 A Calculate the allele and genotype frequency for the data of human MN blood group with the help of following details. 08

Genotypes	Numbers
$L^M L^M$	1750
$L^M L^N$	3142
$L^N L^N$	1055
Total	5947

Q 4 B Explain in brief about Speciation.

07

OR

Q 4 C Calculate the genotype and allele frequency for the data received from genetic variation in Milkweed beetles for the locus that codes for the enzyme phosphoglucosmutase. 08

Genotypes	Numbers
$A^1 A^1$	04
$A^1 A^2$	41
$A^2 A^2$	84
$A^1 A^3$	25
$A^2 A^3$	88
$A^3 A^3$	32
Total	274

Q 4 D Explain genetic drift in detail.

07

Q 5 Write short note on any three of the following

15

- Assumptions of hardy-Weinberg law
- Multiple alleles.
- Davis U-tube experiment
- Replica plate technique
- Natural selection