

2 ½ Hours

Total Marks: 75

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)

1. Define Genotype.
2. _____ genes are the genes which when mutated can result in the lethal phenotype.
3. The ratio for dominant epistasis is _____.
4. State true or false: Environmental factors influence expression of genes.
5. Define Dominant trait.
6. A cross between a homozygous dominant individual and a homozygous recessive individual will always result in a _____ individual.
7. ABO blood type in humans is a characteristic due to multiple _____.
8. Define Transductant.
9. State true or false: In a Hfr X F⁻ cross, the frequency of recombination is low.
10. Give the term for an extra-chromosomal self-replicating circular DNA in bacteria.
11. Give an example of bacterial transposon.
12. Griffith's experiment on transforming principle was conducted using virulent and non virulent strains of _____.
(*E.coli*/ *Pneumococci*/ Lambda phage)
13. Bacterial transposable elements have _____ at the ends.
(inverted repeats/ poly A tails/ poly C-G pairs)
14. Define Gene flow.
15. When a wild type of a phenotype undergoes mutation to give a mutant type of a phenotype the mutation is _____ mutation.

16. Calculate proportion of polymorphic loci for a population of 25 frogs wherein 10 were polymorphic.
17. Give the full form of AGE.
18. Give an example of a restriction enzyme.
19. State true or false: Random mating is mating between genotypes occurring in proportion to the frequencies of the genotypes in the population.
20. _____ is a type of genetic drift in which population is initially established by a small number of breeding individuals.
(bottleneck effect, founder effect)

Q. 2 A In a pea plant, Purple flowers (P) are dominant over white flowers (p) and round seeds (R) are dominant over wrinkled seeds (r). Perform the following cross using Punnett square method to obtain the phenotype and genotype ratios of F₁ and F₂ generations. 08

A pea plant homozygous dominant for both the colour of the flower and shape of the seed was crossed with a pea plant homozygous recessive for both the colour of the flower and shape of the seeds.

Q. 2 B Elaborate on Dominant epistasis. 07

OR

Q. 2 C What are multiple alleles? Discuss briefly on the inheritance of ABO blood group in man. 08

Q. 2 D Explain the phenomenon of modification of law of dominance with a suitable example. 07

Q. 3 A Discuss significance of 'F factor' and 'sex pili' in bacteria. 08

Q. 3 B Explain the process of 'specialized transduction' with one example. 07

OR

Q. 3 C Compare and contrast between 'transduction' and 'transformation'. 08

Q. 3 D Illustrate the interrupted mating experiment for conjugation in bacteria 07

Q. 4 A Discuss with example the theory of Natural Selection. 08

Q. 4 B Discuss Speciation with suitable examples. 07

OR

Q. 4 C Give full form of PAGE? How PAGE is used by geneticist in measuring genetic variations at the protein level in a population? 08

Q. 4 D Elaborate on Hardy Weinberg law and its assumptions. 07

Paper / Subject Code: 77406 / Life Sciences -II: Genetics.

Q. P. Code: 31306

15

Q 5 Write Short notes on **any three** of the following

- a.** Monohybrid cross.
 - b.** Recessive epistasis.
 - c.** Generalized transduction.
 - d.** Lysogeny in bacteriophages.
 - e.** Computation of Allelic frequencies.
-