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

FYBT-11/10/18

Sem - II ATKT

Q. P. Code: 31305

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) **15**

1. Define Phenotype.
2. _____ dominance is the phenomenon in which one allele is dominant to another and the phenotype of the heterozygote is same as that of the heterozygous dominant.
3. The ratio of recessive epistasis is _____.
4. State true or false: Recessive lethal alleles are recognized by a 2:1 ratio of progeny types from crosses of two heterozygotes.
5. Define Gene.
6. State true or false: If an individual has a Bb genotype, half of his gametes should have the B allele, and the other half should have the b allele.
7. In a monohybrid cross involving two homozygous parents with one parent having a dominant trait and other is recessive for the trait, what is the chance of the offspring having heterozygous genotype in F1 generation?
   (a) 25% (b) 50% (c) 75% (d) 100%
8. Define Transposon.
9. State true or false: 'Gal' and 'Bio' genes are selectively transferred in bacteria due to transduction by phage lysate of P1 bacteriophage.
10. State true or false: R plasmids are responsible for sexual discrimination in bacteria.
11. Give an example of a bacteriophage which infects *E.coli.*
12. Viral DNA integrated into bacterial chromosome is termed as _____. (prophage/bacteriophage/plasmid)
13. During conjugation, the transfer of genetic material in donor cells is initiated by _____. (Lambda bacteriophages /F factor / naked DNA)
14. Define Mutation.

15. _____is mating between genotypes occurring in proportion to the frequencies of the genotypes in the population.
(Random mating, Non-random mating).

16. Calculate proportion of polymorphic loci for a population of 100 garden lizards wherein 20 were polymorphic.

17. Give the full form of RFLP.

18. State true or false: *Carbonaria* species is an example of the phenomenon of Natural selection.

19. State true or false: Genetic basis for speciation is based on Haldane's rule.

20. Movement of genes takes place when the organisms or gametes migrate and contribute their gene pool to the recipient population. This phenomenon is called as _____.

Q. 2 A A true breeding homozygous dominant Violet coloured flower with round seeds was crossed with a true breeding homozygous recessive white coloured flower with wrinkled seeds. **08**

Answer the following questions based on above cross.

i. What are the phenotype and genotype of the parents?
ii. What will be the phenotype and genotype of F1 progeny?
iii. Which Mendelian law results in dominant phenotype flowers in the F1 generation?
iv. What will be the phenotype and genotype ratio of F2 generation if the F1 progeny is selfed?

Q. 2 B What is epistasis? With a suitable example explain dominant epistasis. **07**

OR

Q. 2 C What are the different characteristics of multiple alleles? Explain their inheritance with an example. **08**

Q. 2 D Explain how the gene interaction between two independently assorting genes R and P affect the comb shape in chickens. **07**

Q. 3 A Compare and contrast between conjugation and transduction. **08**

Q. 3 B Discuss the discovery and mechanism of transformation in bacteria. **07**

OR

Q. 3 C Illustrate how conjugation can lead to recombination in bacteria. State its importance in microbial genetics. **08**

Q. 3 D Discuss the establishment of lysogeny in bacteriophages. **07**

Q. 4 A	What are restriction enzymes? How are the genetic variations determined at DNA level using restriction enzymes?	**08**
Q. 4 B	Discuss in detail theory of Natural selection.	**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	Discuss the role of Population genetics in Conservation Biology.	**07**

Q. 5 Write Short notes on **any three** of the following **15**

a. Back cross and Test cross with a suitable example.

b. Essential genes and lethal alleles.

c. Transduction by P1 bacteriophages.

d. Lederberg and Tatum's experiment for evidence of conjugation.

e. Computation of Genotypic frequencies.