

Bs/ZOO/M6 T

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(FYUGP)

(6th Semester)

ZOOLOGY

(MINOR)

Paper : ZOO/M6 T

(Principles of Genetics)

Full Marks : 75

Pass Marks : 40%

Time : 3 hours

*The figures in the margin indicate full marks
for the questions.*

(PART : A—OBJECTIVE)

(Marks : 25)

I. Choose the correct answer : 1×15=15

1. In a classic dihybrid cross ($YyRr \times YyRr$),
the phenotypic ratio of the offspring
from two unlinked genes is

(a) 3 : 1

(b) 12 : 3 : 1

(c) 1 : 1 : 1 : 1

(d) 9 : 3 : 3 : 1

2. When both the alleles are fully and distinctly expressed in heterozygous state, it is called as
 - (a) incomplete dominance
 - (b) codominance
 - (c) epistasis
 - (d) pleiotropy
3. Those traits controlled by genes located on X chromosomes are called
 - (a) sex-linked traits
 - (b) sex-influenced traits
 - (c) sex-limited traits
 - (d) All of the above
4. Crossing over occurs during
 - (a) leptotene
 - (b) zygotene
 - (c) pachytene
 - (d) diplotene
5. Linked genes are genes that
 - (a) are located on different chromosomes and assort independently
 - (b) are located on different chromosomes and tend to be inherited together
 - (c) are located on the same chromosomes and assort independently
 - (d) are located on the same chromosomes and tend to be inherited together

6. Somatic cell hybridization technique was developed primarily as a tool for
 - (a) producing monoclonal antibodies
 - (b) cloning
 - (c) gene mapping
 - (d) gene therapy
7. A point mutation that changes a purine nucleotide to another purine is called a
 - (a) transversion mutation
 - (b) transition mutation
 - (c) frameshift mutation
 - (d) silent mutation
8. Down syndrome is an example of
 - (a) monosomy
 - (b) trisomy
 - (c) polyploidy
 - (d) triploidy
9. The most common type of DNA damage caused by UV-B is the formation of
 - (a) single-strand breaks
 - (b) double-strand breaks
 - (c) pyrimidine dimers
 - (d) All of the above

10. The sex chromosome in Turner syndrome is characterized by
- (a) XXY
 - (b) XYY
 - (c) XXX
 - (d) XO
11. Extrachromosomal inheritance is also called
- (a) Mendelian inheritance
 - (b) cytoplasmic inheritance
 - (c) genomic imprinting
 - (d) sex-linked inheritance
12. In human, heterogametic sex is found in
- (a) male
 - (b) female
 - (c) Both (a) and (b)
 - (d) Neither (a) nor (b)
13. Which of the following processes requires a viral vector?
- (a) Conjugation
 - (b) Transformation
 - (c) Transduction
 - (d) All of the above

14. Which of the following best describes bacterial transformation?

- (a) It requires direct physical contact between donor and recipient cells
- (b) It involves the uptake of naked DNA from the environment
- (c) It requires a viral vector
- (d) None of the above

15. Which of the following best describes a bacteriophage?

- (a) A virus that infects bacteria
- (b) An antibacterial drug
- (c) A bacterial flagellum
- (d) A symbiotic microorganism

II. Write short notes on any *five* of the following : 2×5=10

1. Epistasis
2. Sex-linked characters
3. Linkage
4. Gene mutations
5. Polygenic inheritance
6. Extrachromosomal inheritance
7. Transposable elements

(6)

(PART : B—DESCRIPTIVE)

(Marks : 50)

1. Explain incomplete dominance and codominance with suitable examples. 10

Or

Write notes on the following : 5+5=10

(a) Multiple alleles

(b) Lethal alleles

2. Give a detailed account on the cytological basis of crossing over. 10

Or

Explain in detail recombination frequency as a measure of linkage intensity. 10

3. Explain the classification of chromosomal aberrations with proper diagrams and examples. 10

Or

Discuss the molecular basis of mutations induced by UV light. 10

4. Explain the mechanism of sex determination in *Drosophila*. 10

Or

Give an account of mitochondrial mutations in *Saccharomyces*. 10

(7)

5. Describe the mechanisms of bacterial conjugation with suitable diagrams. 10

Or

Write notes on the following : 5+5=10

- (a) P elements in *Drosophila*
- (b) Bacteriophage

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