(6 pages)

S.No. 7093 **P 22 ZOCC 1 A**

(For candidates admitted from 2022–2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Zoology— Core Choice Course

MOLECULAR GENETICS

Time : Three hours Maximum : 75 marks

SECTION A — (20 marks)

I. (A) Multiple choice questions: (5 × 1 = 5)

1. Which codon base is called as the Wobble base?

(a) Fourth (b) Third

(c) Second (d) First

2. Nucleotides are

(a) Heptoses (b) Hexoses

(c) Tetroses (d) Pentoses

3. The fist restriction endonuclease identified was

(a) EcoRI (b) BamI

(c) HindII (d) SmaI

4. In Maxam.Gilbert sequencing the chemical used for guanine specific cleavage is

(a) Dimethyl sulphate (b) Acetic acid

(c) Piperidine (d) Chloroform

5. Germ-line gene therapy is

(a) Not heritable

(b) Sometimes heritable

(c) Heritable

(d) Unrelated to heredity

(B) Fill in the blanks : (5 × 1 = 5)

6. In eukaryotes transcriptional regulation of gene is through _____

7. In human mitochondria _____ number of proteins are encoded by mitochondrial genome and synthesized within mitochondria.

8. The map unit 1 cM indicates ———— percentage of the total recombination events.

9. Genomic library is usually constructed using ————

10. ———— is defined as the study of variations in DNA and RNA characteristics relation to drug in response.

II. Descriptive type questions: (5 × 2 = 10)

11. What is a muton?

12. Describe the importance of Shine Dalgarno sequence?

13. Explain the principle of methyl interference assay.

14. What is a expression vector?

15. What is the working principle of siRNA?

SECTION B — (5 × 5 = 25)

Answer ALL questions, choosing either (a) or (b)

16. (a) Comment on the structural organization of genes in eukaryotes.

Or

(b) With suitable examples explain the role of environment in regulating gene expression.

17. (a) What is repetitive DNA? Explain the types and their importance.

Or

(b) Write short notes on

(i) Unitary pseudogenes and

(ii) Pseudo-pseudogenes

18. (a) Describe the working principle and applications of DNA finger printing.

Or

(b) What is Northern blotting? Discuss its principle and application.

19. (a) How will you perform a phage display? Explain with a neat diagram.

Or

(b) What is FISH? Explain its working principle and add a note on its application citing suitable examples.

20. (a) What is transgenic technology? Explain the principle, steps involved and application of transduction for horizontal gene transfer.

Or

(b) Discuss the principle, relevance and application of somatic gene therapy in modern medicine citing suitable examples.

SECTION C — (3 × 10 = 30)

Answer any THREE questions.

21. What is a gene cluster? Explain the models that explain its formation and its role in gene expression regulation.

22. Give an account on genome organization in a nucleosome.

23. Explain the principle, working and application of polymerase chain reaction.

24. Write an essay on microarray and its application in biomedical research.

25. Discuss with suitable examples the concept of pharmacogenomics for disease diagnosis and treatment in humans.
