Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Master's Degree Examination – May 2025
II Semester

Class : I P.G. **Time: 3 Hours**
Major : Biochemistry **Max. Marks: 100**

23MBCCO9 Genetics and Molecular Biology

Course Outcomes:

CO1: Explain the laws of inheritance and the nature of the hereditary material at the cell, individual and population levels
CO2: Understand the role of genetic mechanisms in evolution diploid and haploid life stages, sexual reproduction human genetics.
CO3: Predict changes in population and distinguish genetic polymorphism and know the legal issues in genetics, professional ethics and behavior.
CO4: Acquire in depth knowledge on the central dogma of molecular biology and provide Possible ranslational opportunities for health care and industrial applications.
CO5: Explore the regulation off genomes and associated challenges in dealing with human diseases.

Part A **10 x 1 = 10**
Choose the Correct Answer

1. Identify the tendency of an offspring to resemble its parent is known as CO1K1
a. Resemblance b. Variation c. Heredity d. Inheritance

2. Identify the genotypic ratio of a monohybrid cross CO1K2
a. 3:1 b. 1:2:1 c. 9:3:3:1 d. 2:1:1

3. Restate the outward visible expression of the hereditary constitution of an organism. CO2K2
a. Genes b. Phenotype c. Genotype d. Genome

4. Match the number of chromosomes present in our human body CO2K1
a. 43 b. 46 c. 23 d. 43

5. Identify the enzyme which act as a molecular scissor for cutting the two DNA strand in DNA replication CO3K1
a. Ligase b. Restriction endo nuclease c. Topoisomerase d. DNA polymerase

6. In DNA replication, the role of ligase is CO3K1
a. Strand joining b. Positive Supercoiling c. Strand breakage d. Negative supercoiling

7. Indicate the types of RNA molecules which carries the amino acids that are added to the growing polypeptide chain CO4K2
a. Ribosomal RNA b. Transfer RNA c. Messenger RNA d. Primary mRNA transcript

8. Name the prokaryotic proteins begin with this modified amino acid CO4K1
a. Methionine b. N- formyl methionine c. N-formyl adenine d. N- formyl serine

9. Recall the collection of base sequences are corresponding to specific amino acid is called as CO5K1
a. chromatin b. Genetic code c. Operon d. Proteomics

10. Identify the first initiation codon which is mainly coded by AUG CO5K2
a. Lysine b. Methionine c. Arginine d. Glycine

Part B **5 x 6 = 30**

Answer ALL questions

Each answer should not exceed 400 words or two pages

11.a. Describe the crossing over concept of laws of inheritance. CO1K2

(or)

11.b. Explain the linkage of inheritance. CO1K2

12.a. Summarize the concept of gene frequency. CO2K2

(or)

12.b. Discuss the factors influencing allele frequency. CO2K2

13.a. Describe the structure and properties of DNA. CO3K2

(or)

13.b. Classify the types of RNA. CO3K2

14.a. Explain the Ecoli -RNA polymerase in transcription. CO4K2

(or)

14.b. Describe the DNA Polymerase I,II and III. CO4K2

15.a. Discuss genetic code . Explain the salient features of genetic code. CO5K2

(or)

15.b. Demonstrate the post translational modification process of translation. CO5K2

Part C **5 x 12 = 60**

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. Explain briefly about the Mendelian Laws of Heredity with evidences. CO1K2

(or)

16.b. Discuss about the chromosomal mapping in fruit fly- Drosphila melanogaster. CO1K2

17.a. Explain the detailed notes on structure and types of chromosome. CO2K2

(or)

17.b. Describe the mechanism of genetic variation at the molecular level. CO2K2

18.a. Describe the detailed mechanism involved in DNA replication in bacteria. CO3K2

(or)

18.b. Explain the various types of DNA repair mechanism**.** CO3K2

19.a. Describe the various mechanism involved in transcription. CO4K2

(or)

19.b. Explain the detailed notes on post transcriptional processing of prokaryotic and Eukaryotic m RNA. CO4K2

20.a. Explain the various mechanism involved in translation process. CO5K2

(or)

20.b. Summarize the detailed mechanism of Lac operon. CO5K2

****