FACULTY	HEALTH SCIENCES AND VETERINARY MEDICINE		
SCHOOL	VETERINARY MEDICINE		
DEPARTMENT	PRECLINICAL STUDIES		
SUBJECT	MOLECULAR BIOLOGY		
SUBJECT CODE	V3642EM		
DATE	NOVEMBER, 2024		
DURATION	2 hours	**MARKS**	100
SECOND OPPORTUNITY EXAM: V3642EM			

Examiner: Prof. S. Chitanga.

Internal Moderator: Prof E. Nepolo.

External Moderator: Prof J. P. Chamunorwa.

This examination paper consists of Three (3) pages including this cover page.

Instructions:

i. The question paper is divided into two (2) sections. Read and understand the instruction for each Section.

ii. Indicate your student number on every page of your answer script.

iii. Write legibly.

SECTION A. Answer all questions in this section. [60 marks]

1. Define the following terms as they apply to molecular biology.

   a. Molecular Biology. **[2 marks]**

   b. DNA Sequencing. **[2 marks]**

   c. Allele. **[2 marks]**

   d. Leading strand of DNA replication. **[2 marks]**

   e. Gene. **[2 marks]**

2. List the main functions of nucleic acids in an organism. **[10 marks]**

3. Outline the general stages of transcription in both Eukaryotes and Prokaryotes. **[10 marks]**

4. Briefly describe the three (3) chemical modifications that Eukaryotic messenger RNA (mRNA) undergoes to produce the final functional mRNA. **[10 marks]**

5. List the four (4) main classes/groups of nucleic acid extraction methods that one can apply in the laboratory. **[10 marks]**

6. There are different types of ribosomal nucleic acids (RNA) which are involved in any organism. In a table form, list and outline the function of each of these types of RNA. **[10 marks]**

Section B. Answer any two (2) questions from this section. [40 marks]

1. Failures at various levels of gene regulation in Eukaryotes can result in cancer development. Describe how cancer can develop when regulation fails under the following sub-headings;
   a. Altered gene expression. **[8 marks]**

   b. Epigenetic changes. **[12 marks]**

2. DNA replication is a process that occurs in both Eukaryotic and Prokaryotic organisms. Compare and contrast the process of DNA replication in Eukaryotes and Prokaryotes. **[20 marks]**

3. Describe gene regulation in Eukaryotic cells, clearly indicating the different regulatory stages. **[20 marks]**

END

BEST WISHES