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JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS 2022/2023
YEAR 1 SEMESTER 2 EXAMINATIONS FOR THE DEGREE OF MASTER OF SCIENCE IN
MOLECULAR MEDICINE

TIM 3110: CELL ORGNIZATION, STRUCTURE AND FUNCTION

DATE: FEBRUARY 2023

TIME: 3 HOURS

INSTRUCTIONS: Answer ANY FOUR questions. Each question is 25 Marks

Question One

Spontaneous deamination of 5-methyl-cytosine to T is likely to contribute significantly to high mutation rate that inactivate the p53 tumor suppressor gene in germline cells and in colon tumors.

- i) State the function of tumor suppressor gene and give examples of its gene products (5 Marks)
- ii) Explain how deamination of 5-methyl-cytosine can lead to point mutation and development of mutant strains (10 Marks)
- iii) Describe the base excision repair of T*G mismatch in the p53 tumor suppressor gene (10 Marks)

Question Two

Phenotypical differences between cells of an organism are due to differences in gene expression levels. Give an account of the mechanisms involved in gene expression (25 Marks)

Question Three

- i) Briefly, explain why cells require chromatin remodeling (5 Marks)
- ii) Describe the chromosomal processes that require remodelers. (20 Marks)

Question Four

Describe the different types of Lac operon mutants (25 Marks)

Question Five

The cell cycle is tightly regulated by enzymes and protein complexes. Give an account of this phenomenal with reference to G₁, S, G₂ and mitotic phase (25 Marks)

Question Six

Describe how alteration of DNA methylation can contribute to cancer development (25 Marks)