W1-2-60-1-6

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
University Examinations 2025/2026

SPECIAL/SUPPLIMENTARY EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE IN MOLECULAR MEDICINE

TIM 3103: IMMUNOLOGICAL TECHNIQUES 1

DATE: JUNE 2026 TIME: 3 HOURS

INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS ONLY

1. Describe the following;
   a) Why mouse is an appropriate model for biomedical research (10 marks)
   b) How to develop a humanized severe combined immunodeficiency (SCID) mouse model (15 marks)

2. Sharon is investigating the effect of x-ray irradiation on DNA damage using 53 BP1 as a protein biomarker for DNA damage response. She is already having irradiated fibroblast cells in culture, a primary antibody against 53BP1 and other reagents to undertake immunocytological tests. Describe how she will go about processing the cells for fluorescent microscopic analysis (25 marks)

3.
   a). With the help of a sketch graph, discuss the kinetics of cell growth (13 marks)
   b) Describe how hybrid cell lines are generated (12 marks)

4. Explain various ways in which gene regulation sequences can be studied (25 marks)

5. You have isolated and purified a novel protein from a biochemical preparation. Elucidate how you might determine its subcellular distribution? (25 marks)

6. Mercy has discovered a new compound that has an immune-boosting activity. Having been given peripheral blood from study participants who have taken this novel compound and placebo, can you describe how she can go about demonstrating the effect of the compound on the frequency of B cells, CD4 positive and CD8 positive cells using flow cytometry (25 marks)