



W1-2-60-1-6

**JOMO KENYATTA UNIVERSITY  
OF  
AGRICULTURE AND TECHNOLOGY  
UNIVERSITY EXAMINATIONS 2022/2023**

**FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE  
OF MASTER OF SCIENCE IN MOLECULAR MEDICINE**

**TIM 3102: IMMUNITY & DISEASE**

**DATE: FEBRUARY 2023**

**TIME: 3 HOURS**

**INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS**

**QUESTION ONE (25 MARKS)**

- a) Explain how the acute-phase systemic inflammatory response increases production of effectors consumed during inflammation (12 marks)
- b) Describe the special genes encoding T Cell Receptors (TCRs) (13 marks)

**QUESTION TWO (25 MARKS)**

- a) Explain how NK cells kill tumor cells deficient in MHC class I (13 marks)
- b) Describe how type I interferons interfere with viral replication (12 marks)

**QUESTION THREE (25 MARKS)**

- a) Analyse the immunogenicity and antigenicity of hapten-carrier conjugates (10 marks)
- b) Describe the role of C3d as a "molecular adjuvant" (15 marks)

**QUESTION FOUR (25 MARKS)**

- a) Discuss the potential basis for alloreactivity (13 marks)
- b) Using the one-way mixed lymphocyte reaction describe the stimulation of the Major Histocompatibility Complex II leukocyte proliferation (12 marks)

**QUESTION FIVE (25 MARKS)**

- a) Describe how variant peptides induce or inhibit mature T-cell responses (12 marks)
- b) Explain the principles behind modern vaccination strategies. (13 marks)

**QUESTION SIX (25 MARKS)**

- a) Explain the microbial factors that inactivate or divert the complement system to protect against complement-mediated killing. (12 marks)
- b) Describe how the rearrangement of genomic DNA leads to the production of antibody genes (13 marks)