

Q1 (5 marks)

Describe the specific immune response to a new pathogen. Explain how vaccination exploits ...

- Pathogen has antigens — detected by lymphocytes [1]
- Lymphocytes produce specific complementary antibodies [1]
- Antibodies bind antigens → pathogen destroyed [1]
- Memory cells form — rapid response on re-exposure [1]
- Vaccine: harmless antigen → same response without disease → memory cells provide future protection [1]

Q2 (4 marks) [★ HT]

★ Describe how monoclonal antibodies are produced and explain their use in cancer treatment...

- B lymphocyte (antibody-producing) fused with tumour cell → hybridoma cell [1]
- Hybridoma cloned → large quantities of identical antibodies [1]
- Antibodies specific to tumour cell antigens — attached to drug or toxin [1]
- Drug delivered directly to cancer cells — "magic bullet" — reduces damage to healthy cells [1]