

## IMMNB003 IMMUNOLOGY

Candidates must answer **Sections A, B and C**. Please answer **Sections A and B in a separate book**.

Complete your answers to **Section C on the MCQ answer sheet**.

The fraction of the marks allocated to each section is as follows:

Section A: 25% of total exam marks  
(**essay**, 1 out of 4)

Section B: 50% of total exam marks  
(**short notes**, 6 out of 10)

Section C: 25% of total exam marks  
(**MCQ**, answer all questions)

The 'in course' essay assessment constituted 20% of the final mark.

**TURN OVER**

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### Section A

Discuss ONE of the following statements (approx 30 mins):

1. Discuss how dendritic cells influence immune responses.
2. 'Hypersensitivity reactions cause pathology'. Discuss this statement.
3. What evasion strategies are used by viruses to avoid the immune response?
4. Describe the mechanisms of immune protection at mucosal surfaces.

### Section B

Write short notes on SIX of the following (approx 60 mins):

1. Interferons.
2. Th2 cells.
3. Opsonisation.
4. Somatic hypermutation of antibody genes.
5. NF $\kappa$ B.
6. Immune defences against malaria.
7. Antibody-dependent cellular cytotoxicity.
8. Anti-fungal immunity.
9. Regulatory T-cells.
10. Opportunistic infections in AIDS.

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### SECTION C: Multiple choice questions

Answer all 10 questions. Mark each entry T (True) or F (False). A mark is given for each correct answer and deducted for each incorrect one. No mark is given or deducted for a blank.

1. Neutrophils:
  - a) Are derived from haematopoietic stem cells in the thymus.
  - b) Give rise to tissue mast cells.
  - c) Contain lysozyme.
  - d) Can phagocytose complement-coated bacteria.
  - e) Have granules which stain with eosin.
  
2. The Fab fragment of an antibody:
  - a) Includes the constant region of the light chain.
  - b) Is present in IgM but not IgG antibodies.
  - c) Has a molecular weight of approximately 150 kDa.
  - d) Can bind antigen.
  - e) Has a total of two domains.
  
3. IgE:
  - a) Is present at lower concentrations than IgA in the circulation.
  - b) Has four subclasses.
  - c) Is a glycoprotein.
  - d) Consists of 2 heavy chains and 2 light chains.
  - e) Is important in protection against helminths.
  
4. Binding of antibody to antigen:
  - a) Requires MHC molecules.
  - b) For IgG can be monovalent.
  - c) Involves covalent bonding.
  - d) Is optimized by spatial complementarity.
  - e) Can lead to complement activation by the alternative pathway.
  
5. Th1 cytokines:
  - a) Include IL-2 and IL-4.
  - b) Can activate macrophages.
  - c) Generally act over short distances.
  - d) Tend to upregulate the activity of Th2 cells.
  - e) Specify the production of IgE antibodies by B-cells.
  
6. Complement component C3b:
  - a) Forms part of the membrane attack complex.
  - b) Is only generated following classical pathway activation.
  - c) Can opsonise bacteria for phagocytosis by NK cells.
  - d) Triggers mast cell degranulation.
  - e) Is recognised by Fc receptors.

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7. The following are present on the cell surface of activated dendritic cells:
  - a) CD28.
  - b) CD3.
  - c) MHC Class II.
  - d) CD80.
  - e) Pattern recognition receptors.
  
8. The following molecules contain immunoreceptor tyrosine-based activation motifs (ITAMS) in their cytoplasmic tails:
  - a) T-cell receptor  $\alpha$ -chain.
  - b) T-cell receptor  $\gamma$ -chain.
  - c) CD3  $\gamma$ -chain.
  - d) IL-4 receptor  $\gamma$ -chain.
  - e) Ig- $\alpha$ -chain.
  
9. Defence mechanisms against schistosomes include:
  - a) The release of basic protein by eosinophils.
  - b) The production of IgE antibodies.
  - c) Phagocytosis by neutrophils.
  - d) Histamine release from dendritic cells.
  - e) Complement activation.
  
10. The likelihood of a successful renal transplant can be increased by:
  - a) Using Cyclosporin.
  - b) Using Sodium cromoglycate.
  - c) Using Azathioprine.
  - d) Matching MHC class I antigens.
  - e) Matching ABO blood group.

**END OF PAPER**