UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION

OCTOBER 2025 SEMESTER

COURSE CODE	:	HDB30103
COURSE TITLE	:	CLINICAL LABORATORY IMMUNOLOGY AND SEROLOGY
PROGRAMME NAME	:	BACHELOR OF BIOMEDICAL SCIENCE (HONOURS)
DATE	:	27 JANUARY 2026
TIME	:	2:00PM - 5:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Answer ALL questions for Section A.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. ☐ *Tick if applicable*
9. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

THERE ARE 14 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 40 marks)

Answer ALL questions.

Please use the answer booklet provided.

1. Which cytokine is crucial for activating macrophages and enhancing their antifungal activity?

   A. Interleukin-4 (IL-4).

   B. Interleukin-10 (IL-10).

   C. Interleukin-12 (IL-12).

   D. Tumour necrosis factor-alpha (TNF-α)

2. What is the primary mechanism that breaks down tolerance in autoimmunity?

   A. Over activation of B cells.

   B. Failure of central tolerance.

   C. Deficiency of IgM antibodies.

   D. Suppression of regulatory T cells.

3. What is the primary immunoglobulin involved in Type I hypersensitivity reactions?

   A. IgE

   B. IgG

   C. IgM

   D. IgA

4. Which autoimmune disease involves the destruction of insulin-producing cells in the pancreas?

   A. Type 1 diabetes.

   B. Rheumatoid arthritis.

   C. Celiac disease.

   D. Lupus erythematosus.

5. How do regulatory T cells contribute to immune tolerance and prevention of autoimmunity?

   A. Activating autoreactive B cells.

   B. Suppressing excessive immune responses.

   C. Promoting inflammation.

   D. Enhancing antibody production.

6. What is the primary function of cytotoxic T lymphocytes (CTLs) in tumour immunology?

   A. Recognize and kill cancer cells.

   B. Promote angiogenesis.

   C. Enhance antibody production.

   D. Activate regulatory T cells.

7. Which immunosuppressive molecule is commonly secreted by tumours to evade immune responses?

   A. Transforming growth factor-beta (TGF-β).

   B. Tumour necrosis factor-alpha (TNF-α).

   C. Interleukin-2 (IL-2).

   D. Interferon γ – (gamma).

8. What is the main effector cell involved in Type I hypersensitivity reactions?

   A. B lymphocytes

   B. Macrophages

   C. Mast cells

   D. T lymphocytes

9. Delayed onset of symptoms, such as contact dermatitis, is a characteristic of which type of hypersensitivity?

   A. Type II

   B. Type III

   C. Type I

   D. Type IV

10. Which of the following is a consequence of molecular mimicry in autoimmunity?

    A. Increased phagocytosis by macrophages.

    B. Cross-reactivity between self and foreign antigens.

    C. Enhanced antibody production.

    D. Activation of regulatory T cells.

11. What role do genetic factors play in autoimmune diseases?

    A. Directly cause autoimmunity.

    B. Increase susceptibility to autoimmune disorders.

    C. Inhibit immune responses.

    D. Suppress inflammatory reactions.

12. What is the main role of interferons during viral infections?

    A. Enhance viral attachment.

    B. Inhibit viral replication and spread.

    C. Promote viral replication.

    D. Activate regulatory T cells response.

13. What is a common strategy employed by protozoa to survive within host cells?

    A. Photosynthesis.

    B. Suppression of complement activation.

    C. Formation of cysts.

    D. Inducing apoptosis in host cells.

14. What is the common feature of allergic disorders, such as hay fever and asthma?

    A. Overactive T cells.

    B. Excessive complement activation.

    C. Hypersensitivity reactions involving IgE.

    D. Deficiency in B cells.

15. Which type of immune cells are primarily responsible for the rapid response to viral infections?

    A. T cells.

    B. Macrophages.

    C. B Cells.

    D. Natural killer (NK) cells.

16. How do protozoa evade the host immune response in some cases?

    A. Inhibiting phagocytosis.

    B. Enhancing complement activation.

    C. Promoting antibody production.

    D. Rapid antigen variation.

17. What is the primary function of the complement system in bacterial infections?

    A. Inhibiting T cell activation.

    B. Activating phagocytosis.

    C. Inducing apoptosis.

    D. Enhancing antigen presentation.

18. Which autoimmune disease is associated with Type II hypersensitivity?

    A. Rheumatoid arthritis

    B. Graves' disease

    C. Systemic lupus erythematosus

    D. Multiple sclerosis

19. In Type III hypersensitivity, immune complexes can deposit in which of the following locations?

    A. Synovial joints.

    B. Alveoli of the lungs.

    C. Epidermis of the skin.

    D. Renal glomeruli.

20. What does the term "seroconversion" refer to in serology testing?

    A. Formation of immune complexes.

    B. Production of antibodies in response to an infection.

    C. Activation of regulatory T cells.

    D. Decrease in total white blood cell count.

21. Which autoimmune disorder primarily affects the joints, causing inflammation and pain?

    A. Multiple sclerosis.

    B. Type 1 diabetes mellitus.

    C. Rheumatoid arthritis.

    D. Lupus erythematosus (SLE).

22. Graves' disease is characterized by the immune system targeting which organ or tissue?

    A. Liver cells.

    B. Lungs alveolar tissue.

    C. Kidney cells.

    D. Thyroid gland.

23. Which immune checkpoint molecule, when blocked, has shown significant success in enhancing the anti-tumor immune response in cancer immunotherapy?

    A. CD4 (cluster of differentiation 4).

    B. MHC (major histocompatibility complex).

    C. PD-1 (programmed cell death protein 1).

    D. CTLA-4 (cytotoxic T-lymphocyte-associated protein 4).

24. Which immunoglobulin class is involved in antibody-dependent cell-mediated cytotoxicity (ADCC) against cancer cells?

A. IgG

B. IgD

C. IgM

D. IgA

25. Which serological test is commonly used to diagnose syphilis by detecting antibodies against the causative bacterium?

A. ELISA.

B. RPR (Rapid Plasma Reagin) test.

C. Western blot.

D. PCR (Polymerase Chain Reaction).

26. In a precipitation reaction, the optimal ratio of antigen to antibody is known as ____ .

A. zone of inhibition

B. zone of reactivity

C. zone of excess

D. zone of equivalence

27. Which of the following is a direct measurement of antibody concentration in a serum sample?

A. ELISA.

B. Immunofluorescence.

C. Radial immunodiffusion.

D. Immunoelectrophoresis.

28. What is the purpose of a complement fixation test in immunology diagnostics?

    A. Assess T cell function.

    B. Measure complement levels.

    C. Identify specific antibodies.

    D. Detect viral RNA.

29. Which pattern recognition receptors (PRRs) on immune cells recognize fungal cell wall components?

    A. B cell receptors (BCRs).

    B. Major histocompatibility complex (MHC) receptors.

    C. Chemokine receptors.

    D. Toll-like receptors (TLRs).

30. What is the primary role of flow cytometry in immunology diagnostics?

    A. Detect viral RNA.

    B. Quantify specific cell populations based on surface markers.

    C. Assess liver function.

    D. Measure antibody titters.

31. What type of T cells are primarily involved in the immune response against fungal pathogens?

    A. T-helper cells (Th1).

    B. Cytotoxic T cells.

    C. T-helper cells (Th2).

    D. Regulatory T cells (Tregs).

32. The primary antifungal activity of neutrophils is through _____.

A. cytokine secretion

B. complement activation

C. antibody production

D. phagocytosis

33. Which antibody class is essential for opsonization and phagocytosis of bacteria?

A. IgE.

B. IgA.

C. IgM.

D. IgG.

34. In the diagnosis of allergic reactions, which test measures the concentration of specific IgE antibodies in the blood?

A. Western blot.

B. PCR (Polymerase Chain Reaction).

C. ELISA.

D. RAST (Radioallergosorbent) test.

35. Which immunosuppressive molecule is commonly secreted by tumours to evade immune responses?

A. Interleukin-6 (IL-6)

B. Interferon α – (alpha)

C. Transforming growth factor-beta (TGF-β)

D. Tumour necrosis factor-alpha (TNF-α)

36. Which of the following is a consequence of molecular mimicry in autoimmunity?

A. Activation of regulatory T cells.

B. Increased phagocytosis by macrophages.

C. Enhanced antibody production.

D. Cross-reactivity between self and foreign antigens.

37. In which autoimmune disorder does the immune system attack the myelin sheath of nerve fibber in the central nervous system?

A. Multiple sclerosis.

B. Rheumatoid arthritis.

C. Lupus erythematosus.

D. Crohn's disease.

38. In Type III hypersensitivity, immune complexes can deposit in which of the following locations?

A. Epidermis of the skin

B. Renal glomeruli

C. Synovial joints

D. Alveoli of the lungs

39. How do tumour-associated antigens differ from normal self-antigens?

A. They have no role in cancer development.

B. They are not recognized by the immune system.

C. They are expressed exclusively in healthy tissues.

D. They are overexpressed or aberrantly expressed in tumor cells.

40. In myasthenia gravis, the immune system primarily targets and attacks:_____.

A. neurons

B. blood vessels

C. neuromuscular junction

D. connective tissue

SECTION B (Total: 60 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Survival and pathogenicity of microbes are influenced by their ability to evade or resist protective defenses. Explain the different mechanism of evasion used by viruses and bacteria to evade the immune response.

(20 marks)

Question 2

Hypersensitivity is an undesirable response and this response can be mediated by antibody binding to antigens (Types I-III) and Cell Mediated Reaction to chemicals or proteins (Type IV). Differentiate the mechanism involved in Hypersensitivity type I and IV.

(20 marks)

Question 3

Describe the immunological interactions between viruses and host cells, detailing the processes of immunological combat against this invader.

(20 marks)

Question 4

Myasthenia gravis (MG) is a chronic autoimmune disorder in which antibodies destroy the communication between nerves and muscle.

(a) Discuss the immunological mechanisms involved in Myasthenia Gravis (MG), a chronic autoimmune disorder characterized by persistent muscle weakness. Provide an explanation of the immune reactions that contribute to the pathophysiology of this condition.

(15 marks)

(b) Outline the therapeutic modalities commonly employed for the management of Myasthenia Gravis (MG).

(5 marks)

END OF EXAMINATION PAPER