



Final Exam

Department: Zoology

Major:

Course Title: Animal Physiology 2

Zoology & Chemistry

Code number: Z 423

Mark: 90 Marks

Date: 21/1/2026

Model B

Time: 2hrs.

Q (1) Choose the best answer:

- 1) Which of the following considered as acquired immunity?
a) Lactation b) infection c) Vaccination d) All of the above
- 2) HCl in the stomach fails to act on pathogens if they:
a) Have spines b) Have capsules c) Contain RNA d) Are anaerobic
- 3) Which of the following is NOT a condition of an ideal antigen?
a) Being foreign b) High molecular weight
c) Complex chemical structure d) Identical structure across all species
- 4) A foreign antigen protein with low molecular weight is called:
a) Auto antigen b) Allo antigen c) Complete antigen d) Hapten
- 5) Which antigen type gives the strongest immune response?
a) Xeno antigen b) Auto antigen c) Allo antigen d) Hapten
- 6) During antigen processing, macrophages mainly convert pathogens into:
a) Antibodies b) Small peptides c) RNA d) Complete antigens
- 7) Perforin produced by cytotoxic T lymphocytes to :
a) Activates B cells b) Neutralizes toxins c) Perforates the target cell membranes
d) Stimulates plasma cells
- 8) Perforin released by cytotoxic T cells and.....:
a) Activated B cells b) Eosinophils c) Natural killer cells d) Basophils
- 9) Which of the following is not true about an epitope?
a) Foreign small amino acids. b) It is a large numbers of amino-acids.
c) Determine the type of antigens d) Present on the surface of antigens.
- 10) Monoclonal antibodies are:
a) A number of antibodies produced by different B-lymphocytes.
b) One antibody secreted by different B-lymphocytes.
c) One antibody secreted by one B-lymphocytes.
d) Produced against whole antigen.
- 11) The main functions of the primary function of the immune system?
a) Storage of immune cells. b) Site of reaction with pathogens .
c) Formation and maturation of immune cells. d) To digest food and absorb nutrients.
- 12) Which of the following is an example of a primary immune tissue?
a) Spleen b) Liver c) Thymus gland d) Tonsils and appendix
- 13) Natural Killer (NK) cells are granular lymphocytes so they are:
a) Part of the cellular components of Innate immunity.
b) Part of the cellular components Humoral immunity.
c) Part of the cellular components of Innate and acquired immunity. d) Non of all.
- 14) The MHC Class I molecules are found on:
a) White blood cells. b) All nucleated cells in the body. c) red blood cells.
d) Non of all.
- 15) Which immune cell is primarily responsible for producing antibodies?
a) Mast cells b) B-cells c) Basophils d) Monocytes
- 16) Which cell releases digestive enzymes to lyse parasites?
a) Mast cells b) B-cells c) Basophils d) Eosinophils
- 17) Basophils play an important role mainly in:

- a) Phagocytosis b) Killing bacteria c) Production of histamines d) Producing antibodies
- 18) Which of the following is localized in connective tissue and secretes histamine?
 a) Monocyte b) Dendritic cell c) Mast cell d) NK cell
- 19) Which of the following is a mechanical barrier of the natural immunity?
 a) Mucous b) Skin c) HCl d) a and b
- 20) Collectins help natural immunity and present in:
 a) lungs b) lymph nodes c) spleen d) thymus gland
- 21) The different types of immunoglobulins are differ in the amino acid sequence of:
 a) Variable region of light chain
 b) Constant region of heavy chain (CH1-CH2-CH3)
 c) Antigen-binding site d) Light chain constant region
- 22) Which of the following immunoglobulins is the smallest molecular weight and the longest half-life in blood?
 a) IgA b) IgG c) IgM d) IgD
- 23) Which immunoglobulin is dominant in the primary infection?
 a) IgM b) IgG c) IgE d) IgD
- 24) Which immunoglobulin is dominant in the secondary infection?
 b) IgM b) IgG c) IgE d) IgD
- 25) IgE is mainly responsible for:
 a) Antiparasitic antibody b) Hypersensitivity reactions such as asthma
 c) Antihelminthic antibody d) A and b
- 26) The binding of IgD (on B-cell) and the dissolved antigen result in:
 a) Kills the antigen b) Activates eosinophils c) Activates the B cell to secrete antibodies
 d) Changes into IgE
- 27) Opsonization means.....
 a) Killing cells by perforin release b) Phagocytosis with the help of complement
 c) Triggering hypersensitivity reactions d) Lysing bacterial cells directly
- 28) Which cell type is involved in ADCC process?
 a) Natural Killer (NK) cells b) Neutrophils c) Macrophages d) Mast cells
- 29) Which cells become activated when antibodies bind to their surface during a hypersensitivity reaction?
 a) Eosinophils b) Mast cells c) Both A and B d) None of the above
- 30) MHC is considered a unique human fingerprint because of:
 a) Gene stability b) Polymorphism c) Its presence only in WBC's
 b) Its two-chain structure
- 31) Which of the following is found in all nucleated cells?
 a) MHC II b) MHC I c) Complement d) Th cell
- 32) The antigen-binding site in MHC Class I is located between:
 a) α 1 and β 1 b) α 1 and α 2 c) β 1 and β 2 d) α 3 only
- 33) Complement proteins are mainly secreted by:
 a) Hepatocytes b) WBCs c) Neurons d) T-cells
- 34) Which of the following is considered a primary immunodeficiency factor?
 a) Malnutrition b) Genetic defect causing B-cell deficiency c) X-ray exposure
 d) Severe infections
- 35) In an Indirect Agglutination test, RBCs, latex, or charcoal particles are mainly used as:
 a) A source of antibodies b) A reagent to increase viscosity c) A carrier for the antigen
 d) An enhancer of precipitation only
- 36) During serial dilution in a V-shaped microtiter plate, a patient's antibody titer is interpreted as:

- a) The first well that becomes negative b) The total number of wells used
 c) The last well that still shows agglutination d) The highest volume of serum added
- 37) Which of the following can cause inaccurate results in a qualitative ELISA test if not properly included?
 a) Using a U-shaped ELISA well b) Reading absorbance with an ELISA reader
 c) Not performing a negative control d) Using a polystyrene microplate
- 38) The cut-off value in a qualitative ELISA is calculated based on:
 a) The mean of the positive samples only
 b) The highest absorbance value recorded
 c) Mean of negative controls + (2 × standard deviation)
 d) Total absorbance readings divided by the number of samples
- 39) Which step is essential for determining a patient's concentration in a quantitative ELISA test?
 a) Measuring pH of the buffer b) Using a standard curve with known values
 c) Increasing incubation temperature d) Adding extra enzyme to enhance color
- 40) What happens when ADH secretion decreases?
 a) Increased water reabsorption in kidneys b) Decreased blood pressure
 c) Decreased urine volume d) Increased sodium reabsorption
- 41) Oxytocin is secreted by:
 a) Anterior pituitary gland b) Adrenal gland c) Posterior pituitary d) Thyroid gland
- 42) The TSH hormone mainly stimulates:
 a) Adrenal cortex b) Thyroid gland to secrete thyroxin c) Pancreas to secrete insulin d) Hypothalamus to secrete TRF
- 43) If thyroxin level increases in the blood, what happens next?
 a) TRF and TSH secretion increase b) TRF secretion is inhibited
 c) TSH secretion increases d) Thyroxin continues to rise
- 44) Which of the following is a primary function of Follicle-Stimulating Hormone (FSH) in the female reproductive system?
 a) Stimulate ovulation b) Stimulate the formation of the corpus luteum
 c) Maturation of ova to form Graafian follicle d) Milk production
- 45) ACTH from the pituitary gland makes the adrenal gland produce?
 a) Prolactin b) Cortisol c) LH d) Progesterone
- 46) Which of the following is an example of negative feedback?
 a) Increase in T_3 leads to an increase in TRF
 b) Decrease in T_3 leads to a decrease in TSH
 c) Increase in T_3 inhibits TSH d) Increase in TRF keeps T_3 level constant
- 47) Which of the following conditions is associated with widespread prevalence due to a nutrient deficiency in a specific region?
 a) Simple goiter b) Endemic goiter c) Myxedema d) Hyperthyroidism only
- Which of the following increases its secretion when the body is exposed to psychological stress?
 a) Aldosterone b) Androgens c) Cortisol d) Growth hormone
- 48) During sympathetic nervous system activation, the post-ganglionic neuron primarily releases:
 a) Acetylcholine b) Adrenaline c) Aldosterone d) CRH
- 50) What is the structural unit of the thyroid gland?
 a) Alveoli b) Follicles c) Lobules d) Tubules
- 51) Which element is essential for thyroid hormone synthesis?
 a) Calcium b) Iron c) Iodine d) Sodium
- 52) Which of the following is considered the true active thyroid hormone?
 a) T_1 b) T_2 c) T_3 d) T_4
- 53) Natural Killer (NK) cells are classified as:
 a. Granular leukocytes and part of the innate immune system.

- b. Agranular leukocytes and part of the adaptive immune system.
- c. Granular leukocytes and part of the adaptive immune system.
- d. Agranular leukocytes and part of the innate immune system

54) Which natural immunity component acts as a mechanical barrier?

- a. Collectins
- b) Skin
- c) HCl
- d) complement

55) Perforin released by cytotoxic T cells and cause

- c) Activating B cells
- b) Perforating target cell membranes
- c) Neutralizing toxins
- d) Stimulation plasma cells

Q2 : Choose "True or false" :

1. 10-Primary immunodeficiency is usually caused by external factors such as malnutrition.
2. 11-Complement components are easily destroyed by heat (56°C).
3. 12-The main functions of MHC are self vs non-self differentiation.
4. 13-MHC I is present in all nucleated cells.
5. 14-IgM antibodies secreted in primary infection.
6. 15-Agglutination means trapping of antigens by forming a mesh of granules around them.
7. 1-Adrenaline increases blood glucose levels, leading to hyperglycemia.
8. 2-The zona reticularis is responsible for secretion of sex hormones.
9. 3- T₃ hormone is a catabolic hormone.
10. 4-ADH increase reabsorption of water in proximal convoluted tubule.
11. 5-The posterior pituitary gland secretes Trophic hormones.
12. 6-Oxytocin has a role in uterine contraction and lactation.
13. 7-Increasing GH before puberty causes gigantism.
14. 8-LH stimulates the formation of the corpus luteum and induces ovulation.
15. 9-In indirect ELISA, the substrate reacts with the primary antibody to produce color.

Q3: Written question : (20 degrees)

1- Explain the main differences between natural (innate) immunity and acquired immunity, including their characteristics, components, and how each type responds to pathogens.

2) Write short notes in the hormones of posterior pituitary.

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