FACULTY	HEALTH SCIENCES AND VETERINARY MEDICINE		
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UNIVERSITY OF NAMIBIA

Second Opportunity Examination

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This Paper consists of **SEVEN (7)** pages including this front page.

Instructions

Answer all the questions and
submit this paper with your answer booklet upon completion

SECTION A: MULTIPLE CHOICE QUESTIONS [20 MARKS]

1. The minimum molecular size of an antigen is:
    a. 10 kD
    b. 1000 D
    c. 100 D
    d. 1000 KD

2. Which of the following cell is effective in presenting antigen to memory T cell and Th1 cell?
    a. B cell
    b. Dendritic cell
    c. Macrophage
    d. Neutrophil

3. IgM secreted by plasma cells is a:
    a. Monomer
    b. Dimer
    c. Pentamer
    d. Tetramer

4. The mode of action of IgA in protection is:
    a. Prevents the adherence of microorganisms
    b. Acts as an opsonin
    c. Activates the complement
    d. Antibody-dependent cellular cytotoxicity (ADCC)

5. Cells involved in acquired immune response are:
    a. Natural killer (NK) cells
    b. Macrophages
    c. Neutrophils
    d. Lymphocytes

6. The first component of the complement which initiates the membrane attack complex on the target cell is:
    a. C3a.
    b. C5b
    c. C6.
    d. C9.

7. Which among the following constitutes the second line of defence?
    a. Immune response
    b. Skin and mucous membranes
    c. Inflammatory response
    d. Inflammatory response and skin and mucous membranes.

8. Which class of immunoglobulins protects mucosal barriers?:
    a. IgG
    b. IgM
    c. IgA
    d. Ig D

9. The redness and heat of an inflamed area are due to a local hyperaemia caused by
    a. Vasodilation
    b. Vasoconstriction
    c. Phagocyte mobilization
    d. Production of complement and interferon

10. The coating of particulate antigen by antibody and/or complement components that allows them to be more phagocytized readily is called:
    a. Immune adherence
    b. Complement fixation
    c. Opsonization
    d. Immune complex formation

11. None of the following diseases can be diagnosed using hypersensitivity reaction test except:
    a. Brucellosis
    b. Rabies
    c. Contagious bovine pleuropneumonia
    d. Anthrax

12. The vaccine strain that can be used in the eradication of brucellosis is:
    a. S19
    b. S45/20
    c. Rev-1
    d. RB51

13. The structure formed by the fusion of engulfed materials and enzymatic granules within a phagocytic cell is called a:
    a. Phagosome
    b. Vacuole
    c. Lysosome
    d. Phagolysosome

14. The most potent antigen-presenting cells in processing naïve antigen are:
    a. Macrophages
    b. Dendritic cells
    c. B cells
    d. Neutrophils

15. Under electrophoresis IgM is found in this specific fraction:
    a. α
    b. β
    c. γ
    d. Albumin

16. The first line of defence against viral infection and intracellular bacteria is mediated by:
    a. Macrophages
    b. Neutrophils
    c. Natural killer cells (NKs)
    d. Cytotoxic T lymphocytes (CTLs).

17. The first lymphoid organ to develop in a new-born is the:
    a. Thymus
    b. Spleen
    c. Lymph nodes
    d. Mucosal lymphoid tissue

18. Which among the following is the main antibody of both primary and secondary immune response?
    a. IgM
    b. IgG
    c. IgA
    d. IgE

19. What is the ideal temperature for the storage of vaccines?
    a. $1\text{-}10^0$ C
    b. $2\text{-}8^0$ C
    c. $5\text{-}10^0$ C
    d. $1\text{-}5^0$ C

20. The most abundant class of immunoglobulin in serum is:
    a. IgM
    b. IgG
    c. IgA
    d. IgD

SECTION B: TRUE/FALSE, FILL IN AND MATCHING QUESTIONS **[30 MARKS]**

(a) True/False questions **[13 marks]**

1. One antigen-presenting cell can present many epitopes to T cell simultaneously.
2. The variable region of an immunoglobulin is located in its carboxyl terminal, and the constant region in its amino terminal end.
3. Naïve cytotoxic T cells are capable of killing target cells.
4. Circulating free immunoglobulin M (IgM) can activate the complement.
5. The complement system is active in healthy, uninfected animals.
6. Circulating free immunoglobulin M can activate the complement.
7. Antimicrobial immunity consists of an early innate response followed by a more sustained adaptive response.
8. Primary immunodeficiency affects only adaptive immune functions.
9. Primary immunodeficiency results from genetic or developmental defect in the immune system.
10. The serum of a tumour-bearing animal may cause the tumours of other animals to grow even faster.
11. Acquired immune mechanisms are found only in phylogenetically advanced vertebrates.
12. Vaccine doses are formulated to account for body weight or age.
13. A graft from a monkey to a human is an example of an allograft.

(b) Fill in the blanks. **[10 marks]**

1. B cells can be found in thymus of new-born……
2. The principal immunoglobulin in chicken serum is …..
3. The immunoglobulin class which is more involved in allergic reactions is …..
4. A tumour that is capable of indefinite growth and does not invade or undergo metastasis is known as ….. tumour, whereas a tumour that continues to grow and becomes progressively invasive is called ….. tumour.
5. Opportunistic pathogens can cause disease only in ….. animals.
6. B cell activation and maturation in the periphery require the interaction with ……
7. Veterinary vaccines prevent animal diseases, but do not prevent ……
8. Antibodies are simply soluble B cell ……
9. ….. immunodeficiency is a condition in which animals fail to produce functioning T and B lymphocytes.

(c) Matching questions **[7 marks]**

(a) Match the vaccine and the disease it corresponds to. [3]

Vaccine	Attribute
1. First marker vaccine	a. Rabies
2. First recombinant antigen for vaccine	b. Pseudo rabies
3. First use of viral vector for vaccine	c. Foot and Mouth Disease
	d. Foot hand and mouth disease

(b) The type of bacterial antigen and its explanation [4]

Type antigen	Explanation
1. "O" antigens	a. Capsular antigens
2. "K" antigens	b. Superficial antigens
3. "Vi" antigens	c. Somatic antigens
4. "H" antigens	d. Antigens attached to red blood cell membranes
	e. Viral antigens
	f. Haptens

SECTION C: SHORT ANSWER QUESTIONS **[10 MARKS]**

QUESTION 1. Name the steps of vaccine production comprised in the upstream processing [2]

QUESTION 2. Define

(a) "Ring vaccination". [3]

(b) Cytokines [2]

QUESTION 3. Name the two types of the inflammatory process [2]

QUESTION 4. What method is used to vaccinate almost all commercial poultry broilers against Marek's disease? [1]

SECTION C. STRUCTURED QUESTIONS **[60 MARKS]**

QUESTION 1. **[10 marks]**

(a) Name the steps of biotechnological approaches in vaccine development using recombinant DNA technique [5]

(b) Name three (3) methods used for the purification of the microorganisms during the vaccine production process [3]

(c) Name the two types of methods/systems for culturing bacteria used in the production of vaccines. [2]

QUESTION 2. **[10 marks]**

(a) List the methods used to inactivate microorganisms in the process of vaccine production. [4]

(b) Classify vaccines based on their origin and name the types of adjuvant used [6]

QUESTION 3. **[10 marks]**

(a) Name and briefly explain (in one short and concise sentence) the cardinal signs of inflammation [5]

(b) Name the tests used in the quality control of vaccines before they are released for use. [5]

QUESTION 4. **[10 marks]**

(a) Describe the phases in life cycle of B-lymphocytes. How are lymphocytes that have never encountered a pathogen, called? [5]

(b) Define Immunoregulation and state its significance in veterinary medicine [5]

QUESTION 5. **[10 marks]**

(a) List the names of the Major Histocompatibility Complex (MHC) in domestic animals. [7]

(b) What reflects the function of MHC molecules in immunologic responses in animals? [1]

(c) What is the involvement of MHC class I and II molecules, respectively, in immunologic responses in domestic animals? [2]

QUESTION 6. **[10 marks]**

(a) Describe the role of the inflammatory process in immunologic responses. [2]

(b) Name the two types of the inflammatory process and their characteristics [8]

END OF PAPER