



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGY, CHEMISTRY AND PHYSICS

QUALIFICATION : BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	LEVEL: 7
COURSE: ANIMAL STRUCTURE AND FUNCTION	COURSE CODE: ASF701S
DATE: JUNE 2023	SESSION: 1st OPPORTUNITY
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER

EXAMINER: Dr N. Muzhinji

MODERATOR: DR R. Bock

**THIS EXAMINATION QUESTION PAPER CONSISTS OF FIVE (5) PAGES
(INCLUDING THIS FRONT PAGE)**

INSTRUCTIONS

1. All examination **RULES** apply
2. Answer **ALL** the questions
3. Read all the questions carefully before answering
4. Marks are indicated at the end of each question
5. Write clearly and neatly
6. All written work **MUST** be done in **BLUE** or **BLACK** ink

Section A: Multiple Choice Questions (10 marks)

1. Which type of squamous epithelium tissues lines the surface of mouth and oesophagus?
 - A. Simple squamous epithelium
 - B. Simple cuboidal epithelium
 - C. Simple columnar epithelium
 - D. Stratified squamous epithelium

2. Marine animals that are isoosmotic with their surroundings and do not regulate their osmolarity are called
 - A. Osmoregulators
 - B. Osmoconformers
 - C. Ectotherms
 - D. Endotherms

3. In a study of immune activation, it is shown that macrophages have peptides displayed by MHC II molecules on their cell surfaces. Display of these peptides is most likely to have a primary effect on stimulation of which of the following processes?
 - A. Apoptosis
 - B. immunoglobulin secretion
 - C. T helper activation
 - D. T cell induced cytolysis

4. How does a fertilized egg generate a great diversity of cell types?
 - A. The same genome expresses different sets of genes in different cell types
 - B. Localized Cytoplasm determinants
 - C. Influenced by environments
 - D. Different Genomes

5. Which statement is true about pattern formation,
 - A. It involves the process of cells becoming oriented to the body plan.
 - B. It involves the cell's ability to detect positional information that impacts the fate of the cell
 - C. It is the process of cells becoming specialized
 - D. Is the physical process of organizing specialized cells giving rise to its organs and organ systems

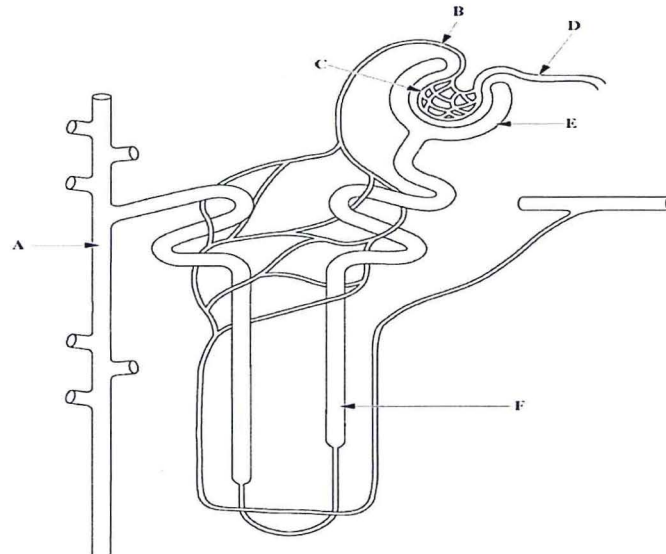
6. Which type of cells are responsible for stimulating the rejection of tissue grafts and organ transplants?
 - A. MHC molecules
 - B. B- Cells
 - C. Natural Killer Cells
 - D. Antibodies

7. Which of the following is not produced in the stomach?
- A. Gastrin
 - B. Mucus
 - C. Pepsinogen
 - D. Trypsinogen
8. Following the sections of the large intestine, as material passes from the transverse colon, what section does it enter next
- A. Ascending
 - B. Descending
 - C. Sigmoid
 - D. Rectum
9. Which of the following is NOT true?
- A. THE term epitope is not synonymous with antigen
 - B. A viral protein may contain a large number of epitopes that are capable of interacting with many different specific antibodies
 - C. Immunologic receptors on T cells recognize continuous (linear) epitopes
 - D. Antibody variable region is complimentary in shape to the epitope
10. In terms of evolution, why might the urea cycle have evolved in organisms?
- a. So organisms could adapt to the changing environment when terrestrial life forms evolved
 - b. So organisms could evolve the ability to switch between direct ammonia excretion and urea
 - c. So organisms could reduce their excretion of ammonia in the form of urea
 - d. So organisms could adapt to the changing environment and excrete higher concentrations of uric acid

Section B: Answer all questions (90 Marks)

1. a. State and explain any two parameters that are homeostatically regulated in the human body. [4]
b. Explain the mechanisms of acclimatization of ectotherms and endotherms to changes in environmental temperature. [4]
2. Describe the major components of a homeostatic control system. [6]
3. Diseases such as pancreatic cancer and human immunodeficiency virus (HIV) can interfere with the healthy functioning of the pancreas. What would happen to the digestion of carbohydrates, proteins, and fats when the pancreas is dysfunctional? [3]
4. State two (2) major components of the central nervous system. [2]
5. Write brief notes on the following:
 - a. Conception [2]
 - b. Acrosomal reaction [2]
 - c. Cellular differentiation [2]
 - d. Gastrulation [2]
 - e. Cortical reaction [2]
- 6.a Explain the difference between humoral response and cell mediated response giving examples. [4]
b. Explain why a secondary antibody response to an antigen may prevent a bacterial or viral disease when the primary adaptive immune response to that antigen did not protect the person from the disease. [3]
c. Outline the innate and adaptive immune system's response to the invading virus like influenza virus. [7]
7. Binding of antigen to a mature lymphocyte induces the lymphocyte's proliferation and differentiation, a process called clonal selection.
 - a. Explain why clonal selection of antibodies is important for the immune system. [2]
 - b. In HIV testing, explain why CD4 cells are used as an indicator to determine the level of immunity of an individual. [2]
8. Describe the bone formation process. [4]
9. Compare and contrast oogenesis from spermatogenesis. [4]

10. Examine the nephron diagram below and answer the following questions



- i. Explain the significance of the differences in diameter between structure **B** and structure **D**. [2]
 - ii. Starting with a solution that enters and escapes into the Bowman's capsule as glomerulus filtrate, describe the changes that occur in its composition as it moves through each of this regions below:
 - a. Proximal tubule [2]
 - b. Descending loop of henle [2]
 - c. Ascending loop of henle [2]
 - d. Distal tubule [2]
 - e. Collecting duct [2]
11. The purpose of the excretion system is to excrete urea, however in the collection duct some of the urea is reabsorbed into the system. Can you explain why this is the case? [2]
12. Compare the two divisions of the autonomic nervous system. [6]
13. a. Compare and contrast Basal Metabolic Rate and Standard Metabolic Rate. [2]
 b. List five (5) factors that influences the metabolic rate of animals. [5]
 c. If a mouse and a lizard of the same mass were placed in an experimental chamber under identical environmental conditions, which animal would consume oxygen at a high rate? Explain your answer [4]
14. State the symptoms of the following disorders of the nervous system,
- i. Alzheimer's disease (AD) [2]
 - ii. Schizophrenia [2]