



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION : BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	LEVEL: 7
COURSE: ANIMAL STRUCTURE AND FUNCTION	COURSE CODE: ASF701S
DATE: JUNE 2022	SESSION: 1st OPPORTUNITY
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER (S)	Dr Norman Muzhinji
MODERATOR	Prof Ronnie Bock

INSTRUCTIONS	
<ol style="list-style-type: none">1. All examination RULES apply2. Answer ALL questions3. Read all the questions carefully before answering4. Marks are indicated at the end of each question5. Write clearly and neatly6. All written work MUST be done in BLUE or BLACK ink	

PERMISSIBLE MATERIALS

None

ATTACHMENTS

None

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

Section A: Multiple Choice Questions (8 marks)

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

2. 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

3. 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

4. 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

5. 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

6. Which of the following is not produced in the stomach?
 - A. Gastrin
 - B. Mucus
 - C. Pepsinogen
 - D. Trypsinogen

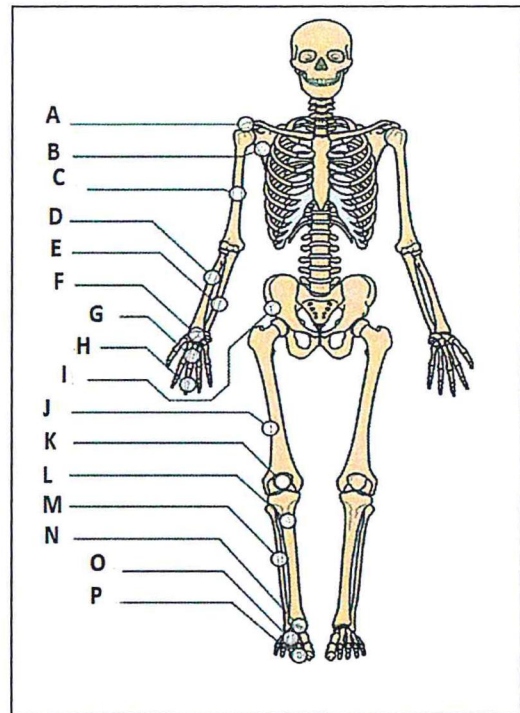
7. Following the sections of the large intestine, as material passes from the transverse colon, what section does it enter next?
- A. Ascending
 - B. Descending
 - C. Sigmoid
 - D. Rectum
8. Which of the following is NOT true?
- A. The term epitope is not synonymous with antigen
 - B. A viral protein may contain many epitopes that can interact 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

Section B: Answer all questions using the spaces provided (92 Marks)

1. Describe the major components of a homeostatic control system. [6]
2. a. After a meal, blood glucose level rises. Explain how the body respond to return blood glucose levels to normal in a healthy individual. [2]
- b. Explain why the body cannot act in the same way in a person who has type 1 diabetes. [2]
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. List five (5) adaptations that help desert animal thermoregulate. Give an example of the animal. [4]
6. Write brief notes on the following;
- a) Cytokines [2]
 - b) Major Histocompatibility Complex 1 [2]
 - c) Acrosomal reaction and cortical reaction [4]
 - d) Clonal selection of B cells [2]

- e) Cell differentiation [2]
- f) Gene expression [2]
- 7 a. Explain the difference between humoral response and cell mediated response giving examples. [4]
- b. Describe the processes involved in the generation of immunoglobulin antigen diversity. You may use annotated diagrams in your answer. [4]
- c. 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]
- d. Outline the innate and adaptive immune system's response to the invading virus like SARS-COV-2, the causal agent of COVID-19. [7]
- e. Describe the functions of the following classes of immunoglobulins; [4]
- i. IgM
 - ii. IgE
 - iii. IgG
 - iv. IgA
- f. In HIV testing, explain why CD4 cells are used as an indicator to determine the level of immunity of an individual? [2]
- g. Binding of antigen to a mature lymphocyte induces the lymphocyte's proliferation and differentiation, a process called clonal selection. Explain why clonal selection of antibodies is important for the immune system? [3]
- 8 a. Describe the bone formation process. [4]
- b. The appendicular skeleton is the portion of the skeleton of vertebrates consisting of the bones that support the appendages. Match the following bones to their locations (A-P) on the skeleton figure overleaf.
NB: // Each bone **ONLY** matches one letter [6]

- | | |
|-------|-------|
| I. | - E |
| II. | - G |
| III. | - A |
| IV. | - M |
| V. | - C |
| VI. | - P/H |
| VII. | - O |
| VIII. | - J |
| IX. | - L |
| X. | - B |
| XI. | - N |
| XII. | - F |



9. The following are some of the functions performed by sensory receptors. Explain
- | | | |
|----|----------------------|-----|
| a. | Sensory transduction | [1] |
| b. | Transmission | [1] |
10. Compare and contrast oogenesis from spermatogenesis. [4]
11. The menstrual cycle is controlled by four hormones. These hormones have an effect on target organs such as the ovaries and the uterus. The diagram below shows the hormone levels of the four hormones and the relative thickness of the uterus lining during a typical 28-day menstrual cycle. Use the graph and your own knowledge to explain the changes that occur to prepare a woman's body to receive a fertilised egg and then allow it to grow and develop. [6]
12. Compare the two divisions of the autonomic nervous system. [6]
13. State the symptoms of the following disorders of the nervous system;
- | | | |
|----|--------------------------|-----|
| a. | Alzheimer's disease (AD) | [2] |
| b. | Schizophrenia | [2] |

THE END