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: 07B0SC	**LEVEL:** 7
COURSE: ANIMAL STRUCTURE AND FUNCTION	**COURSE CODE:** ASF 701S
DATE: JULY 2023	SESSION: JULY
DURATION: 3 HOURS	**MARKS: 100**

SECOND OPPORTUNITY EXAMINATION QUESTION PAPER

EXAMINER: Dr N. Muzhinji
MODERATOR: DR R. Bock

THIS EXAMINATION PAPER CONSISTS OF SIX (6) 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 (12 marks)

1. Which of the following statements is incorrect
   A. Tissues and organs make up the organ systems of the body
   B. Nervous tissue senses stimuli and transmits signals throughout the animal
   C. Muscle tissue is the least abundant tissue in most animals
   D. Nervous tissues are responsible for communication, coordination and regulation of cell activity

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 is not a type of epithelial tissue
   A. Simple cuboidal epithelium
   B. Simple squamous epithelium
   C. Stratified epithelium
   D. Basement epithelium

6. 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?

7. 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

8. Which of the following is not produced in the stomach

   A. Gastrin
   B. Mucus
   C. Pepsinogen
   D. Trypsinogen

9. 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

10. At primary infection, the serum fraction contains predominantly which immunoglobulin?

   A. IgG
   B. IgA
   C. IgM
   D. IgE

11. Antidiuretic hormone increases water reabsorption in the distal tubules and collecting ducts of the kidney.

   True or False?

12. Unlike an earthworm's metanephridia, a mammalian nephron

   A. Forms urine by changing fluid composition inside a tubule
   B. Has a transport epithelium
   C. Is intimately associated with a capillary network
   D. Receives filtrate from blood instead of coelomic fluid.

Section B: Answer all questions (88 Marks)

1. Describe the major components of a homeostatic control system. [6]

2. Imagine you are one of the participants at the 18th Edition of the Rossini Uranium Mine annual marathon held in Walvis Bay last month. Comment on what will happen to your blood sugar levels and how would negative feedback affect this variable during the race? [3]

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. Write short notes on the following

   a) Cytokines. [2]

   b) Major Histocompatibility Complex 1. [2]

   c) Major Histocompatibility II. [2]

   d) Clonal selection of B cells. [2]

   f) Gene expression [2]

   e). i. Determination [2)

   ii. Explain the two sources that determines the fate of a cell [6]

5. Explain the difference between humoral response and cell mediated response giving examples. [4

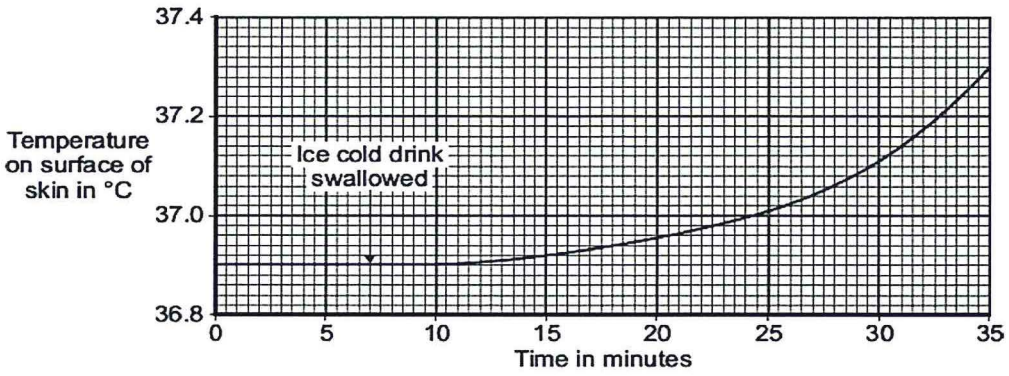
6. Describe the Diencephalon part of the brain. [6]

7. One of the athletes who participated at the Ya Toivo half Marathon held in Windhoek over the weekend completed the marathon in 2 hours 15 minutes on a dry day (dry air) and outside temperatures of 35°C. In such dry air, the body will not overheat. What will happen if the same marathon was ran in humid conditions at temperatures of 35^0C? Explain your answer. [3]

8. Briefly explain the differences between hibernation and torpor and adaptation strategies to temperature changes? [4]

9. Discuss the process of sperm entry into the egg during fertilisation. [10]

10. A man sat in a room where the temperature was maintained at 40 °C. The temperature on the surface of his skin was monitored for 35 minutes. He swallowed an ice-cold drink at the time indicated on the graph.



a. The sweat glands contribute to the change in the temperature on the surface of the skin shown on the graph. Explain how. [3]

b. The blood vessels near the surface of the skin also contribute to the changes in skin temperature shown on the graph. How does this change in the blood vessels explain the change in the skin temperature shown on the graph? [3]

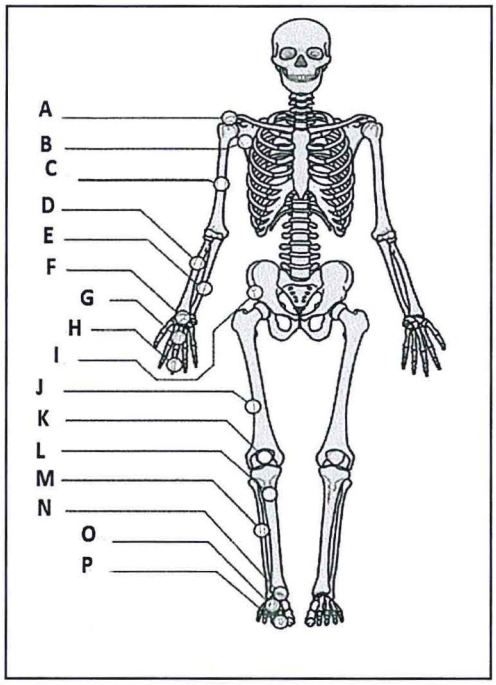
11. Roughly 60% of the mass of the body is water and despite wide variation in the quantity of water taken in each day, body water content remains incredibly stable. One hormone responsible for this homeostatic control is antidiuretic hormone (ADH). (a) Describe the mechanisms that are triggered in the mammalian body when water intake is reduced. [6]

12. Mouse were given a diet with water plus dry seed and another group an environment that mimics their natural habitat. Molarity and urine were measured.
    a. Describe how the data from the two treatments will differ between the two groups of animals? [3]

    b. Will the data provide evidence of homeostatic regulation? Explain [2]

13. a. 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 below. NB: // Each bone **ONLY** matches one letter [6]

I. Ulna
II. Metacarpals
III. Clavicle
IV. Tibia
V. Humerus
VI. Phalanges
VII. Metatarsals
VIII. Femur
IX. Patella
X. Scapula
XI. Tarsals
XII. Carpals



b. The following are some of the functions performed by sensory receptors. Explain

i. Sensory transduction [1]
ii. Transmission [1]

14. 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]