POLYTECHNIC OF NAMIBIA
SCHOOL OF HEALTH AND APPLIED SCIENCES
DEPARTMENT OF HEALTH SCIENCES
ENVIRONMENTAL HEALTH SCIENCES PROGRAMME

QUALIFICATION(S): BACHELOR OF ENVIRONMENTAL HEALTH SCIENCES
QUALIFICATION CODE: 08BEHS
NQF LEVEL: LEVEL 8

COURSE NAME: ANATOMY AND PHYSIOLOGY
COURSE CODE: AAP511S
NQF LEVEL: LEVEL 6

DATE: JUNE 2015
DURATION: 3 HOURS
MARKS: 100

1st OPPORTUNITY EXAMINATION QUESTION PAPER

EXAMINER(S): Munyaradzi Zivuku
MODERATOR: Mr CD Izaaks

INSTRUCTIONS:
1. Answer all questions in section A, section B and any two from section C
2. Please write and draw neatly and legibly.
3. No books, notes and other additional aids are allowed.
4. Marks all answers clearly with their respective question numbers.

PERMISSIBLE MATERIALS
1. NONE

ATTACHMENTS:
1. NONE

This paper consists of 9 pages including this cover
SECTION A

QUESTION 1 [20 MARKS]

Evaluate the statements in each numbered section and select the most appropriate answer or phrase from the given possibilities. Write only the appropriate letter next to the question in the answer book provided.

1.1 The smallest unit of an element that still retains the chemical and physical properties of that element is called; (1)
   A. an isotope
   B. a nucleus
   C. an atom
   D. a molecular bond.

1.2 What substance is used in medicine to produce various images of organs and tissues? (1)
   A. a mixture
   B. a tracer
   C. an emulsion
   D. a sensor.

1.3 CaCl₂ is a salt that forms as the result of what type of bond? (1)
   A. covalent
   B. hydrogen
   C. polar
   D. ionic

1.4 In an acidic solution (1)
   A. the number of H⁺ is less than the number of OH⁻.
   B. the number of H⁺ is greater than the number of OH⁻.
   C. the number of H⁺ is equal to the number of OH⁻.
   D. the number of H⁺ is 3 times less than the number of OH⁻.
1.5 A solution containing 0.00001 moles of H⁺ has a pH of; (1)
A. 3
B. 5
C. 7
D. 8

1.6 Which of the following is not one of the four classes of organic molecules found in cells? (1)
A. nucleic acids
B. vitamins
C. proteins
D. lipids

1.7 What protein provides flexibility and strength to connective tissues? (1)
A. actin
B. collagen
C. keratin
D. myosin

1.8 As a result of an infection, which component of blood would increase? (1)
A. platelets
B. erythrocytes
C. plasma
D. leukocytes

1.9 The stripes in skeletal muscle are due to the presence of; (1)
A. multiple nuclei per cell
B. actin and myosin filaments
C. the branching of the cells
D. intercalated discs
1.10 Which body system will return excess tissue fluid to the cardiovascular system? (1)

A. lymphatic
B. urinary
C. digestive
D. muscular

1.11 Normal blood pressure is 120/80. What is the top number called and what is happening in the heart? (1)

A. systolic pressure, ejection of blood from the heart
B. diastolic pressure, ejection of blood from the heart
C. systolic pressure, ventricles are relaxing
D. diastolic pressure, atria are contracting, ventricles are relaxing

1.12 Which of the following diseases is caused by a virus? (1)

A. strep throat
B. tuberculosis
C. chicken pox
D. gonorrhoea

1.13 Where do T lymphocytes mature? (1)

A. thymus
B. thyroid
C. spleen
D. red bone marrow

1.14 Which of the following is not considered a barrier to entry of a pathogen? (1)

A. intact skin
B. mucous membranes
C. sebaceous secretions
D. inflammatory response
1.15 What do "having the measles" and being vaccinated against the measles have in common? (1)
A. they are both forms of active immunity
B. they are both forms of neutral immunity
C. they are both forms of passive immunity
D. they are both forms of an infection

1.16 Which of the following is not part of the respiratory system? (1)
A. trachea
B. pharynx
C. oesophagus
D. bronchus

1.17 When the pH of the blood becomes more acidic, the respiratory center. (1)
A. increases the rate and increases the depth of breathing
B. increases the rate and decreases the depth of breathing
C. decreases the rate and increases the depth of breathing
D. decreases the rate and decreases the depth of breathing

1.18 Which of the following is not a symptom of emphysema? (1)
A. the elastic recoil of the lungs is reduced
B. the surface area for gas exchange is reduced
C. the alveoli are distended and their walls damaged
D. the airways are inflamed and filled with mucus

1.19 When you entered the room, there was a faint smell of smoke, but after about an hour, you no longer noticed the smell. What happened? (1)
A. sensory reception
B. sensory adaptation
C. mechanoreception
D. nociception
1.20 Which of the following statements is not true concerning rod and cone cells?

A. both have an outer segment jointed to an inner segment by a short stalk
B. both contain a deep purple pigment called rhodopsin
C. both have pigment molecules embedded in the membrane of the outer segment
D. both contain retinal, a derivative of vitamin A
Match the organs system (column A) to their correct functions/description (column B). Write only the correct answer letter from column B that corresponds to the correct description.

<table>
<thead>
<tr>
<th>Column A – Organ system</th>
<th>Column B - description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 special senses</td>
<td>A. receives, breaks down and absorbs food substances and excretes waste products.</td>
</tr>
<tr>
<td>2.2 urinary system</td>
<td>B. serves in removing waste products from the blood and excreting wastes in the form of urine.</td>
</tr>
<tr>
<td>2.3 skeletal system</td>
<td>C. provides protection against diseases and infection.</td>
</tr>
<tr>
<td>2.4 respiratory system</td>
<td>D. provides the framework for the body and works to protect and support the body.</td>
</tr>
<tr>
<td>2.5 reproductive system</td>
<td>E. provides for body movements.</td>
</tr>
<tr>
<td>2.6 nervous system</td>
<td>F. involved with reproduction and childbirth</td>
</tr>
<tr>
<td>2.7 integumentary system</td>
<td>G. protects the organism from injury, diseases and infection, aids in the regulation of temperature, the excretion of waste and the reception of sensation.</td>
</tr>
<tr>
<td>2.8 immune system</td>
<td>H. Takes in oxygen from the air and gives off carbon dioxide, which is produced by the cell metabolism.</td>
</tr>
<tr>
<td>2.9 muscular system</td>
<td>I. serves to regulate various body functions through glands that secrete hormones directly into the blood to slow down or increase the activity of the cells.</td>
</tr>
<tr>
<td>2.10 endocrine system</td>
<td>J. coordinates body activities by receiving, interpreting and conducting messages to all other system of the body.</td>
</tr>
<tr>
<td>2.11 digestive system</td>
<td>K. transport materials throughout the body including waste products.</td>
</tr>
<tr>
<td>2.12 circulatory system</td>
<td>L. functions in receiving sensations such as light.</td>
</tr>
</tbody>
</table>
SECTION B

QUESTION 3  [10 MARKS]

3.1 The diagrams below show polymers that are found in plants and animals. Study the diagrams and answer the question that follows as briefly as possible.

<table>
<thead>
<tr>
<th>Polymer A</th>
<th>Polymer B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Polymer A" /></td>
<td><img src="image2.png" alt="Polymer B" /></td>
</tr>
</tbody>
</table>

3.1.1 What process leads to the formation of polymer A? Explain your answer fully. (3)

3.1.2 State ONE visible difference in structure between polymer A and polymer B. (2)

3.1.2 Name the polymers labelled A, B. (2)

3.2.3 State THREE other differences between polymer A and polymer B, apart from differences in structure. (3)

QUESTION 4  [22 MARKS]

4.1 Define the term homeostasis. (1)

4.2 Distinguish between positive and negative homeostatic control. (2)

4.3 Describe how child birth is a typical example of positive feedback mechanism. (5)

4.4 Discuss three major functions of blood. (6)

4.5 Sarah’ s blood pressure is given as 120/80. Interpret this statement. (3)

4.6 Deduce the consequences of hypertension and how it can be used to assess the health of an individual. (5)
QUESTION 5

5.1 Compare the structure and function of the artery and the vein. (4)

5.2 The diagram below shows the concentration of antibody for an individual's first and second exposure to a pathogen.

![Diagram showing antibody concentration over time](image)

5.2.1 Differentiate between active and passive immunity. (4)

5.2.2 Describe the trend given in the diagram and how it can confer long lasting immunity to an individual. (4)

SECTION C

Answer any two questions from this section. Each question carries 12 marks.

QUESTION 6

6.1 Distinguish between outbreak, epidemic and pandemic. (3)

6.2 Outline the significance of mechanical and chemical digestion in the mouth. (4)

6.3 Explain how carbohydrates, proteins and fats are processed in the small intestines. (5)
QUESTION 7

7.0 The diagram below shows stages in the generation of an action potential.

![Diagram showing stages of an action potential](image)

7.1 Complete the stages labelled A, B, and C. (3)
7.2 Outline how urine is formed under the following headings
   7.2.1 Filtration (4)
   7.2.2 Selective reabsorption (3)
   7.2.3 Secretion (2)

QUESTION 8

8.1 List four types of receptors and their function. (4)
8.2 Explain the role of the hypothalamus. (2)
8.3 Define the term hormone. (2)
8.4 State one hormone produced by the posterior and one by the anterior pituitary gland and their function. (4)