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| ST. #: ………………………………………………………………………………………………………………………… |
| QUALIFICATION(S): ………………………………………………………………CENTRE:…………………… |
| MODE OF STUDY:   FM   PM   DM |
| CLASS VENUE: …………………………………………………………………………………………………………………… (FHAS Aud., or Mining Aud.) |
| COURSE NAME: BASIC SCIENCE |
| COURSE CODE: BSC410S |
| DATE: 14 MAY 2019 |
| DURATION: 2 HOURS |
| MEMO |
| MARKS: 90 |

### BASIC SCIENCE MAKE UP TEST, SEMESTER 1

#### EXAMINER(S):
Mr. V. Indongo; Mr. T. Nanghonga; Mr. P. Paulus; Ms. M. Amuanyena; Ms. M. Mutwa

#### INSTRUCTIONS:
1. Answer all the questions in this questions paper.
2. For Multiple Choice questions, CYCLE the correct answer with a blue/black INK pen.
3. No books, notes and other additional aids are allowed.
4. A Periodic Table is attached at the back of this question paper.

#### PERMISSIBLE MATERIALS
- Only a scientific calculator is allowed

This paper consists of 10 pages including this cover page
1. During intraspecific competition.
   a. Competition is between different species.
   b. Competition is between abiotic organisms.
   c. Competition is between populations.
   d. **Competition is between the same organisms.**

2. All of the following statements about ecology are correct except;
   a. Ecology is the study of the interactions between biotic and abiotic aspects of the environment.
   b. Ecologists may study populations and communities of organisms.
   c. **Ecology is a discipline that is independent from natural selection and evolutionary history.**
   d. Ecology spans increasingly comprehensive levels of organization, from individuals to ecosystems.

3. An organism’s scientific name consists of its________________ .
   a. Its class name and its family name.
   b. Its kingdom name and its phylum name.
   c. **Its genus name and its species name.**
   d. Its phylum name and its species name.

4. In symbiotic relationships Commensalism refers to ;
   a. Two species interacting with each other and both are organisms.
   b. Two species interacting with each other and both species benefit.
   c. **Two species interacting with each other, one specie benefits and the other is unaffected.**
   d. Two species interacting with each other, one species benefits and host species is harmed.

5. The two types of parasites found in ecology are ;
   a. Endoparasites and parasites that live in the body of the host.
   b. Endoparasites , and parasites that live in the digestive system.
   c. **Ectoparasites and parasites living inside the body.**
   d. Ectoparasites and parasites that are on a host.
6. A sunflower plant is tilting towards sunlight and making its energy by photosynthesis. Which characteristics of living things are being described here? (2)

A. Growth and reproduction
B. Cellular organization and use of energy
C. Movement and nutrition
D. Use of energy and development

7. Retardation in growth and poor bones development in children is by the deficiency of which nutrient and mineral? (2)

A. Carbohydrates and Potassium
B. Proteins and Calcium
C. Fats and Vitamin D
D. Water and Iodine

8. Pasteurization in one of the key initial processes in the manufacturing of dairy products, that is its function? (2)

A. To destroy pathogenic bacteria and other microorganisms that may cause unwanted changes.
B. To convert the lactose in the milk into lactic acid
C. To coagulate the milk
D. To give taste to the dairy products

9. Biological control agents are used in agriculture for controlling plant diseases and pests. What is the advantage of using biocontrol agents to the environment? (2)

A. It increases agricultural produce
B. The plants will become very green and grow fast
C. Prevent pollution by reducing dependence on toxic chemicals and pesticides
D. To make the plants resistant to infections by pathogens

10. Biotechnology is defined as ___________________________? (2)

A. The study of industrialization
B. The use of living organisms and bio-processes to make products of interest
C. The study of innovation and technology
D. None of the above
11. Antibiotics are ___________________________? (2)
   A. Chemical substances produced by some microbes to kill or retard the growth of disease-causing microorganisms
   B. Are hormones that regulates body reactions
   C. Chemical that are involved in metabolism
   D. Proteins that fight against diseases

12. What proportion is water in human body? (2)
   A. 40%
   B. 20%
   C. 70%
   D. 90%

13. The condensation of glucose and galactose will yield ________________? (2)
   A. Maltose a disaccharide
   B. Sucrose a disaccharide
   C. Lactose a disaccharide
   D. Lactose a polysaccharide

14. The three macronutrients are _____________. (2)
   A. monosaccharide, polysaccharide, disaccharide
   B. fibre, vitamins, proteins
   C. carbohydrates, lipids, glycerol
   D. lipids, carbohydrates, proteins

15. What elements make up a carbohydrate? (2)
   A. hydrogen, calcium, oxygen
   B. hydrogen, oxygen, carbon
   C. carbon, potassium, oxygen
   D. calcium, potassium, oxygen

SECTION B: CHEMISTRY [30]

QUESTION 1 20 MARKS

1.1 How many significant figures does the measurement 0.0002500 m have? (2)
   A. Two
   B. Four
   C. Seven
   D. Five
1.2 The factor $10^6$ corresponds to which prefix? (2)

A. Mega
B. Micro
C. Milli
D. Nano

1.3 The NBC weather forecast has reported a maximum temperature of $28.4^\circ F$ for tomorrow. What reading would this temperature give in degree Celsius? (2)

A. -2 °C
B. 2°C
C. 19 °C
D. 16 °C

1.4 Carbon dioxide is an example of a sample of matter classified as a: (2)

A. Compound
B. Homogeneous mixture
C. Heterogeneous mixture
D. Element

1.5 Which of the following samples of matter is NOT classified as a compound? (2)

A. Blood
B. Water
C. Salt
D. Glucose

1.6 Which one of the following IS NOT a metal; (2)

A. Iron (Fe)
B. Mercury (Hg)
C. Lead (Pb)
D. Arsenic (As)
Fluorine (F), Chlorine (Cl), Bromine (Br) and Iodine (I) are ALL;  
A. Liquids  
B. Gases  
C. **Halogens**  
D. Metalloids

1.8 Which of these belong in the outermost shell (energy level) of an atom?  
A. **Electrons**  
B. Protons  
C. Neutrons  
D. Photons

1.9 Which one of the following IS NOT an acid?  
A. HCl  
B. **NH3**  
C. CH₃COOH  
D. B and C

1.10 Sulphuric acid (H₂SO₄) will react with sodium hydroxide (NaOH, a base) to form;  
A. Sodium sulphate (salt) and water  
B. Sodium sulphate (salt) and Hydrogen  
C. Sodium sulphate (salt) and water + carbon dioxide  
D. Sodium sulphate (salt)

**QUESTION 2**  
10 MARKS

2.1 Apply the rules of rounding off numbers and round off the numbers below to the number of significant figures stated.

i. Round off 8670 Km to two significant figures
ii. Round off 7.013 g to three significant figures (1)

7.01 g

iii. Round off 0.01025 m to three significant figures (1)

0.0102 m

iv. Round off 0.003629 mm to three significant figures (1)

0.00363 mm

2.2 State the physical separation method you would use to separate the following mixtures:

i. Two immiscible liquids (1)

Separating funnel

ii. Two miscible liquids with different boiling points (1)

Fractional distillation

2.3 Phase changes that result in heat being given off are called exothermic and those that absorb heat are called endothermic. (1)

2.4 Carry out the following calculation and report the answer to the correct number of significant figures (1)

\[
\frac{249.362 + 41}{63.498}
\]

4.57

2.5 Complete the following reactions:

i. \[ \text{Zn (s)} + 2 \text{HCl (aq)} \rightarrow \text{H}_2 (g) + \text{ZnCl}_2 \] (1)

ii. \[ \text{NaOH (aq)} + \text{HCl (aq)} \rightarrow \text{NaCl} + \text{H}_2\text{O} \] (1)

SECTION C: PHYSICS [30]

Circle the correct answer [20]

1. What is an atom?

(a) A fundamental unit of matter. [2]
(b) The path along which the electric current moves.
(c) The device which causes the flow of electrons through a circuit.
(d) A combination of neutrons and protons together.
2. Electric charge is given by the symbol and unit; 
   (a) I and A  
   (b) Q and C  
   (c) A and Ω  
   (d) C and I

3. An electric current flow only when there is....... 
   (a) Electrical energy and closed circuit.  
   (b) There is a very small gap in the circuit.  
   (c) A new battery and an open circuit.  
   (d) No voltage.

4. The SI unit for resistance is ............... 
   (a) Ohm  
   (b) Volts  
   (c) Amperes  
   (d) Ammeter

5. The current in a parallel circuit .......... 
   (a) divides  
   (b) is the same everywhere in the circuit.  
   (c) increases at every component.  
   (d) equals to the voltage

6. Which of the following is not an example of a force? 
   (a) An object’s weight  
   (b) Mass  
   (c) Tension in a rope  
   (d) Friction

7. Which of the following is not a Newton’s law of motion? 
   (a) Inertia  
   (b) R = V/I  
   (c) F = ma  
   (d) Action-reaction
8. When more than one forces are applied on the same object and they are in the same direction we.........
   (a) Divide.
   (b) Subtract.
   (c) Add.
   (d) Multiply.

9. The SI unit of force is...........
   (a) Kg
   (b) m/s
   (c) N
   (d) Km

10. Weight is the force of gravity that is written as...............[2]
    (a) \( F = ma \)
    (b) \( R = V/I \)
    (c) \( W = mg \)
    (d) \( I = Q/t \)

11. Find the resultant force and the acceleration of the figure below. [6]

\[ \begin{align*}
\text{Resultant Force, } F_R &= -32 \text{ N} + 10 \text{ N} + 15 \text{ N} = -7 \text{ N} \\
\text{Acceleration} &= F_R/m = -7 \text{ N}/2 \text{ kg} = -3.5 \text{ m/s}^2
\end{align*} \]

12. Current is the rate of flow of charges in a circuit. Suppose that a conductor transfers a charge of 3 C in 4 s, supplied with the voltage of 12V. What is the resistance of a conductor? [4]

\[ I = \frac{Q}{t} = \frac{3 \text{ C}}{4 \text{ s}} = 0.75 \text{ A} \]

From Ohm’s law: \( V = IR \), \( R = \frac{V}{I} = \frac{12\text{V}}{0.75\text{A}} = 16 \Omega \)

END
### PERIODIC TABLE OF THE ELEMENTS

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