NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: ALL PROGRAMMES	
QUALIFICATION CODE: VARIOUS	**LEVEL:** 4
COURSE CODE: BSC410S	**COURSE NAME:** BASIC SCIENCE
SESSION: NOVEMBER 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION PAPER (SDA)	
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MODERATOR:	PROF. HABAUKA KWAAMBWA

INSTRUCTIONS	
1.	Write all your answers in the answer booklet provided.
2.	Read the whole question before answering.
3.	Begin each question on a new page.

PERMISSIBLE MATERIALS

Non-programmable Scientific Calculator

THIS QUESTION PAPER CONSISTS OF 12 PAGES

(INCLUDING THIS FRONT PAGE)

SECTION A: BIOLOGY [35]

QUESTION 1: [20]

Question type: Multiple choices. Read the questions carefully, choose and write the correct letter corresponding to the correct answer. Each question weighs **2 marks**.

1.1 An organism's scientific name consists of its _____. (2)

A. class name and its family name.

B. kingdom name and its phylum name.

C. genus name and its species name.

D. phylum name and its species name.

1.2 The organic and inorganic materials in all the organisms will eventually return to the environment by the action of; (2)

A. primary consumers.

B. producers.

C. decomposers.

D. secondary consumers.

1.3 In children, a diet lacking Vitamin D and calcium can be linked to which of the following conditions? (2)

A. rickets

B. scurvy

C. osteoporosis

D. cardiovascular disease

1.4 The hydrolysis of lactose will yield which of the following monosaccharides? (2)

A. glucose and galactose

B. lactic acid and carbon dioxide

C. sucrose and fructose

D. glucose and fructose

1.5 Which of the kingdoms of living things has members that lacks both chloroplast and cell walls? (2)

A. Plantae
B. Animalia
C. Fungi
D. Protista

1.6 During interspecific competition, a competition is between _____. (2)

A. organisms of different species
B. abiotic organisms
C. strong and weak organisms
D. organisms of the same species

1.7 Which of the listed elements make up a carbohydrate? (2)

A. hydrogen, calcium, oxygen
B. hydrogen, oxygen, carbon
C. carbon, potassium, oxygen
D. calcium, potassium, oxygen

1.8 Polysaccharides with more than 10 monomers can be hydrolysed to yield three different subunits which are_____. (2)

A. monosaccharides, dipeptide and oligosaccharides
B. glycosidic bonds, monosaccharides and amino acids
C. amino acids, monosaccharides and disaccharides
D. monosaccharides, disaccharides and oligosaccharides

1.9 The role of fermentation during yoghurt production is _____. (2)

A. to convert glucose into ethanol and carbon dioxide
B. to convert lactose into lactic acid to coagulate the milk protein
C. to preserve the milk for spoiling
D. none of the above statements

1.10 In which way does yoghurt provide us with the health benefit of boosting our immune system? (2)

A. Yoghurt is rich in calcium.
B. Yoghurt has anti-inflammatory properties.
C. Yoghurt provides the body with proteins which are for making antibodies.
D. Both A and B are correct.

QUESTION 2 [15]

Question type: Structured questions.

2.1 State any two domains in which living organisms are classified. (2)

2.2 In which way do the producers and decomposers sustain the smooth functioning of the ecosystem? (4)

2.3 There are many people who think that fats are bad for you. Though it is true in some sense, there is still a need for some fat in the diet. Explain, with three reasons, why fats are important in your body? (3)

2.4 Biotechnology is a broad field of science, which uses living things like plants, animals and microorganisms and their biological processes to make useful products or perform certain functions. It is used in medicine, agriculture, mining and industry.

2.4.1 Explain fermentation? (2)

2.4.2 What gives yogurt the sour taste after fermentation? (1)

2.4.3 What determines the end products of fermentation? (1)

2.4.4 What is the role of time and temperature during fermentation? (2)

SECTION B: CHEMISTRY [30]

QUESTION 3: [20]

Question type: Multiple choices. Read the questions carefully, choose and write the correct letter corresponding to the correct answer. Each question weighs 2 **marks**.

3.1 Which of the following is a quantitative measurement? (2)

A. amount of matter in an object
B. fluorescence of different objects
C. colour change in different objects
D. coarseness of a powder

3.2 Convert 150 °F to Kelvin. (2)

A. 23.15
B. 65.56
C. 338.71
D. 423.15

3.3 Given that 85.0 K is the accepted value for a particular measurement, which of the following experimental trials is precise and accurate? (2)

A. 85.0 K, 87.7 K and 89.9 K
B. 85.0 K, 84.8 K and 84.9 K
C. 83.0 K , 85.0 K and 88.0 K
D. 85.0 K , 89.0 K and 90.0 K

3.4 How many significant figures are in 100.00? (2)

A. 2
B. 3
C. 4
D. 5

3.5 Use the suitable significant figures calculation's rule to solve this mathematical operation; 6.23 x 2.224 (2)

A. 13.8
B. 13.855
C. 13.85
D. 13.9

3.6 Which of the three states of matter possess these features? definite shape, definite volume, small thermal expansion and incompressible. (2)

A. Liquid
B. Solid
C. Gas
D. A and B

3.7 Which of the following is charge free? (2)

A. proton
B. electron
C. neutron
D. none of the above

3.8 Which ion do bases contain? (2)

A. H^+
B. OH^-
C. H_3O
D. NH_3

3.9 One of the physical properties that all acids have is _____. (2)

A. sour taste
B. bitter taste
C. colourful
D. colourless

3.10 Which of the given acids is used as a treatment agent of bone marrow and scurvy diseases? (2)

A. Acetic acid

B. Hydrochloric acid

C. Ascorbic acid

D. Nitric acid

QUESTION 4 [10]

Question type: Structured questions.

4.1 An experiment to determine the boiling point of water, the experimental value measured is 378.2 K and the Accepted /true value is 383.15 K. Determine the error value. (2)

4.2 Define the following terms; element, mixture and compound (3)

4.3 State 2 physical properties of metals (2)

4.4 Complete the table below based on the provided experimental results. (3)

Indicator	Results	Solution
Red litmus paper	Blue	a)
Blue litmus paper	Red	b)
Red litmus paper	c)	Acid
Blue litmus paper	Remains blue	Base

SECTION C: PHYSICS [35]

QUESTION 5: **[20]**

Question type: Multiple choices. Read the questions carefully, choose and write the correct letter corresponding to the correct answer. Each question weighs **2 marks**.

5.1 Which one is a renewable source of energy? (2)

A. nuclear energy

B. natural gas

C. biomass

D. coal

5.2 Which of the following is a correct order for generation of electricity from coal? (2)

A. Supplying electricity → heating water → producing steam → generating electrical power for usage around the country

B. Fusion of coal → heating water → producing steam → turning turbines → electrical power sent around the country

C. Crushing → burning → heating water → producing steam → turning turbines → generating electrical energy

D. Burning → crushing → heating water → producing steam → electrical power → rotating generators → turning turbines

5.3 Which of the following is true for fossil fuels? (2)

A. It is obtained from remains of plant and animal materials.

B. It can also be generated from biomass

C. It is a tidal source of energy

D. It can kill flocks of birds.

5.4 An electrical pump uses energy of 500 J to fill up a tank with water at a height of 4 meters above the ground. Using a gravitational acceleration of 10 m/s^2, what would be the mass of water? (2)

A. 125 kg

B. 50 kg

C. 12.5 kg

D. 40 kg

5.5 During the ascent phase of a rep of the bench press, the lifter exerts an *average* vertical force of 200 N against a barbell while the barbell moves 0.25 m downwards (Figure 1). How much work was done by the lifter to the barbell? (2)

Fig. 1

A. - 0.8 J

B. 200 J

C. 800 J

D. - 50 J

5.6 A 300 gram ball is launched into the air with an initial velocity of 30 centimetres per second. Which statement is NOT true about the ball when it reaches maximum height? (2)

A. Kinetic energy is zero.

B. All kinetic energy is converted into gravitational energy.

C. Potential energy is zero.

D. Total energy is equal to potential energy of a ball.

5.7 The flow of the electrical charges in the circuit is; (2)

A. resistance

B. capacitance

C. electric current

D. voltage

5.8 Good conductors of electricity have; (2)

A. high resistance.

B. low resistance.

C. single route for current to flow.

D. more alternate routes for current to flow.

5.9 When electrical components are connected such that more one path for charges to, then a _____ is formed. (2)

A. parallel connection

B. series connection

C. both series and parallel connection

D. none of the above

5.10 When resistors are connected in parallel, total resistances in the circuit will _____. (2)

A. remain the same

B. increase

C. decrease

D. be shared

QUESTION 6: [15]

Question type: Structured questions.

6.1 The diagram below (Figure 2) shows a ball rolling from A to G. The ball starts at point A and rolls through to point G.

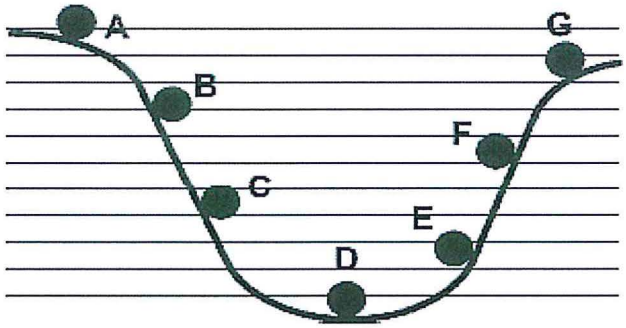

Fig. 2

(i) At which letter does the ball has the highest potential energy? (1)

(ii) At which does the ball has the maximum kinetic energy? (1)

(iii) At point G, the ball has come to a stop. What could be the reason that it could not return back to its original height? (1)

6.2 Study the speed-time graph below (Figure 3) representing a journey of a car and answer the questions relating to the graph.

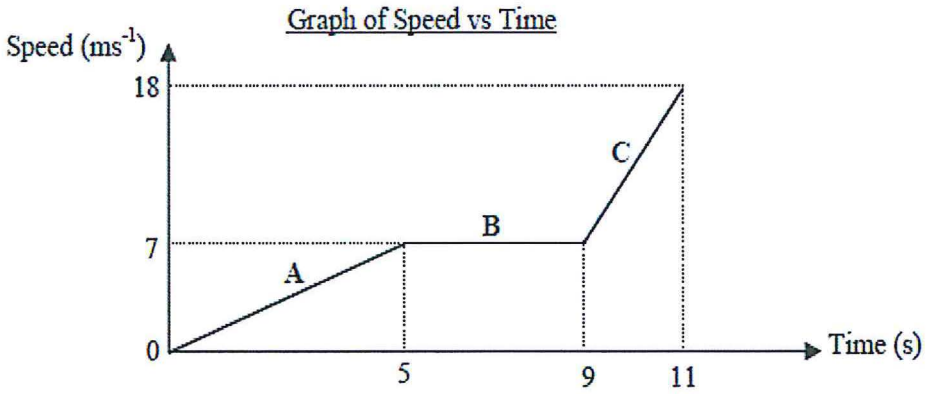

Fig. 3

(i) Describe the motion over the parts B of the graph using one or more of the following terms: *constant, zero, speed, increasing, decreasing, deceleration and acceleration* (1)

(ii) Calculate the acceleration over part C of the graph. (2)

(iii) Calculate the total distance travelled over part A only. (2)

6.3 Distinguish a vector and a scalar. (2)

6.4 State the 3 effects of forces when applied to a stationary object. (3)

6.5 A moving bicycle of mass 4 kg was accelerated at 2.5 m/s^2. Calculate the force applied to a bicycle. (2)

END