



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: VARIOUS	
QUALIFICATION CODE: VARIOUS	LEVEL: 4
COURSE NAME: BASIC SCIENCE	COURSE CODE: BSC410S
SESSION: JANUARY 2020	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION PAPER	
EXAMINER(S)	MR PETRUS PAULUS, DR MARIUS MUTORWA AND MR EMMANUEL EJEMBI
MODERATOR:	PROF HABAUKA KWAAMBWA

INSTRUCTIONS	
1.	Write all your answers in the answer booklet provided, using black/blue ink pen only.
2.	Read the whole question before answering.
3.	Begin each question on a new page.
4.	The Periodic Table is attached at the back of this question paper.

PERMISSIBLE MATERIALS

1. Examination script
2. Scientific Calculator

**THIS QUESTION PAPER CONSISTS OF 10 PAGES
(INCLUDING THIS FRONT PAGE AND PERIODIC TABLE)**

SECTION A: BIOLOGY

[35]

QUESTION 1: Multiple Choice. Each question carries 2 marks.

[20]

- 1.1 Which two of the following are the features used by microorganisms for Movement? (2)
- A. Cilia and Legs
 - B. Flagella and Legs
 - C. Cilia and Fins
 - D. Flagella and Cilia
- 1.2 Which of the following are kingdoms classified as Prokaryotic? (2)
- A. Archaea and Bacteria
 - B. Archaeobacteria and Eubacteria
 - C. Archaea and Eukarya
 - D. Eukarya and Bacteria
- 1.3 Dioecious are _____ . (2)
- A. Organisms that cannot reproduce sexually.
 - B. Plants that have male flowers on one plant and female flowers on another plants.
 - C. Plants that have male and female reproductive parts on different locations on the same plant.
 - D. Plants that produce leaves throughout the year.
- 1.4 The two types of competitions found in ecology are: (2)
- A. Endoparasites and Ectoparasitic competition.
 - B. Interspecific and Endospecific competition.
 - C. Intraspecific and interspecific competition.
 - D. Ectospecific and Endospecific competition.
- 1.5 Detritivores/Scavengers refers to _____ . (2)
- A. Organisms that feed both on plants and animals
 - B. Organisms that end the food chain or food web
 - C. Organisms that feed on tissues of dead organisms
 - D. Organisms that are not required in the ecosystem
- 1.6 Components of the ecosystems that are essentially indispensable to its smooth functioning are _____ . (2)
- A. Biotic and Abiotic factors
 - B. Producers and the Sun
 - C. Producers and Decomposers
 - D. Primary and Secondary consumers

- 1.7 Micronutrients are dietary components often referred to as _____. (2)
- A. monosaccharide and disaccharide
 - B. carbohydrates and proteins
 - C. vitamins and minerals
 - D. carbohydrates and lipids
- 1.8 Vitamins that can be toxic to the body when taken in excessive amount are _____. (2)
- A. Vitamin B and D
 - B. Vitamin C and K
 - C. Vitamin A and K
 - D. Vitamin B and C
- 1.9 One of the main reasons for the increased use of Biotechnology by the food industry is due to _____. (2)
- A. The need to change nutritional value of the food product
 - B. Attempts to increase efficiency and reduce environmental impact of production
 - C. Intentions to create or improve sensory characteristics
 - D. All of the statements above are correct
- 1.10 Which one of the following does not describe the production of gasohol? (2)
- A. It involves the extraction and washing of cane.
 - B. The dilute alcohol is distilled to yield bagasse only.
 - C. The sugars are crystalized out to give molasses.
 - D. The molasses is fermented by microorganism to yield dilute alcohol.

QUESTION 2 Structured questions

[15]

- 2.1 Discuss how a scientific name is written following the principles of the binomial nomenclature system. (3)
- 2.2 Explain why scientific names are more important than common names? (2)
- 2.3 Briefly explain three factors that cause organisms to become endangered or extinct. (3)
- 2.4 Differentiate between polyunsaturated and monounsaturated fat in terms of bonds. (2)
- 2.5 Describe the role of iron in the human body. (2)
- 2.6 Define fermentation and explain its role in the production of gasohol? (3)

SECTION B: CHEMISTRY

[35]

QUESTION 3:

[20]

Question Type: Multiple Choice. Choose and write a letter corresponding to the correct answer. Each correct answer carries **2 marks**.

- 3.1 A process which involves the input of energy or absorption of heat is called: (2)
- A. exothermic
 - B. dissolving
 - C. endothermic
 - D. thermodynamic
- 3.2 An appropriate physical method that can be used to separate an insoluble solid from a liquid is _____. (2)
- A. chromatography
 - B. separating funnel
 - C. fractional distillation
 - D. filtration

- 3.3 How does the presence of a soluble salt affect the freezing point and boiling point of water? (2)
- A. raises the freezing point and lowers the boiling point
 - B. lowers the freezing point and lowers the boiling point
 - C. lowers the freezing point and raises the boiling point
 - D. raises the freezing point and raises the boiling point
- 3.4 Which of the following measurements has the greatest number of significant figures? (2)
- A. 0.2400 mL
 - B. 0.00240 mL
 - C. 24000 mL
 - D. 2.40×10^9 mL
- 3.5 A cyclist travels a distance of 0.5 Km in a time of 0.5 hours. The speed of the cyclist in SI units is equal to _____. (2)
- A. 0.28 m/s
 - B. 0.3 m/s^2
 - C. 1 Km/h
 - D. None of the above
- 3.6 The reproducibility of a series of measurements can be defined as the: (2)
- A. accuracy of the measurements
 - B. precision of the measurements
 - C. uncertainty related to the measurements
 - D. none of the above
- 3.7 In terms of bonding, elements found in Group 5 of the Periodic Table tend to _____. (2)
- A. Lose five electrons
 - B. Lose three electrons
 - C. Gain three electrons
 - D. Gain five electrons
- 3.8 The mixture of two or more metals is known as _____. (2)
- A. Ore
 - B. Alloy
 - C. Metalloid
 - D. Mineral
- 3.9 A common use of nitric acid is the; (2)
- A. manufacture of non-soapy detergents
 - B. treatment of water
 - C. electrolyte in car-lead batteries
 - D. manufacture of fertilizers and explosives

- 3.10 The chemical name for washing soda is: (2)
- A. Sodium hydrogen carbonate
 - B. Sodium carbonate decahydrate
 - C. Sodium hydroxide
 - D. Sodium chloride

QUESTION 4 [15]

Question Types: Brief statement responses.

- 4.1 Define the following terms: (5)
- a. Homogenous mixture
 - b. Quantitative measurement
 - c. Accuracy
 - d. An indicator
 - e. Chemical property
- 4.2 In terms of kinetic theory, discuss how the change in temperature influences the behaviour of atoms during the condensation phase change i.e. changes from gaseous state to liquid state. (3)
- 4.3 How many significant figures does each of the following measurements have? (4)
- a. 2.0020 mm
 - b. 0.000740 g
 - c. 88 000 Kg
 - d. 2 020 000.0 km
- 4.4 List **two uses** for calcium oxychloride. (2)
- 4.5 In agriculture, it is important to monitor the pH of the soil to ensure the growth of crops. State how you would treat soil that is too acidic. (1)

QUESTION 5

[20]

Question Type: Multiple Choice Question. Each question carries 2 marks.

5.1 Which of the following is a type of graph? (2)

- A. Curve graph
- B. Pie Chart
- C. Pyramid
- D. Polygon

5.2 Which of the following instruments is used to measure an electric voltage? (2)

- A. Voltmeter
- B. Galvanometer
- C. Ammeter
- D. Potentiometer

5.3 The electrical symbol in figure 5.1 below represents a _____ . (2)

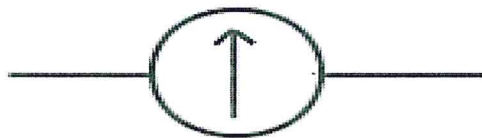


Figure 5.1

- A. Rheostat
 - B. Lamp
 - C. Galvanometer
 - D. Millimeter
- 5.5 Which of the following units given below is the SI unit of power? (2)
- A. Ampere
 - B. Volt
 - C. Ohm
 - D. Watt

5.6 What is the formula for calculating acceleration? (2)

- A. *Acceleration = mass/velocity*
- B. *Acceleration = force/mass*
- C. *Acceleration = mass/force*
- D. *Acceleration = mass/distance*

5.7 A car of mass 1000 kg can produced a force of 8000 N by the engine. Calculate the acceleration of the car. (2)

- A. 8 m/s²
- B. 800 m/s²
- C. 10000 m/s²
- D. 100000 m/s²

5.8 In geothermal energy, _____ produced from underground rocks is used to drive turbines, which drive electric generators to produce electricity. (2)

- A. water
- B. steam
- C. dust
- D. fire

5.9 Which of the following is an example of non-renewable energy? (2)

- A. Wind energy
- B. Geothermal
- C. Nuclear energy
- D. Biofuels

5.10 Energy possessed by a body by virtue of its motion is called _____ . (2)

- A. Physical energy
- B. Potential energy
- C. Kinetic energy
- D. geothermal energy

QUESTION 6

[10]

Question Type: Structured questions

6.1 What is the full meaning of the acronym **T.A.I.L.S** used in line graphs? (2)

6.2 State two advantages and two disadvantages of using Biofuel energy source? (2)

6.3 State Newton's second law of motion. (2)

6.4 You carry a **20 kg suitcase** upstairs for a **distance of 4 m**, how much work did you do? (4)

Taking acceleration due to gravity $g = 10 \text{ m/s}^2$.

END OF EXAM

PERIODIC TABLE OF THE ELEMENTS

1	2											17	18				
1 H 1.00794	2 He 4.00260											9 F 18.9984	10 Ne 20.179				
3 Li 6.941	4 Be 9.01218											8 O 15.9994	16 S 32.06				
11 Na 22.9898	12 Mg 24.305											7 N 14.0067	15 P 30.9738				
19 K 39.0983	20 Ca 40.08	23 V 50.9415	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.69	29 Cu 63.546	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.904	36 Kr 83.8		
37 Rb 85.4678	38 Sr 87.62	39 Y 88.9059	40 Zr 91.22	41 Nb 92.9064	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.906	46 Pd 106.42	47 Ag 107.868	48 Cd 112.41	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.6	53 I 126.9	54 Xe 131.29
55 Cs 132.905	56 Ba 137.33	71 Lu 174.967	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.207	76 Os 190.2	77 Ir 192.22	78 Pt 195.08	79 Au 196.967	80 Hg 200.59	81 Tl 204.383	82 Pb 207.2	83 Bi 208.908	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.025	103 Lr (260)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (264)	108 Hs (265)	109 Mt (268)	110 Uun (269)	111 Uuu (272)	112 Uub (269)	113 Uuq (269)	114 Uuq (269)	115 Uuh (269)	116 Uuh (269)	117 Uuh (269)	118 Uuo (269)

Lanthanides:

57 La 138.906	58 Ce 140.12	59 Pr 140.908	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 161.930	68 Er 167.26	69 Tm 166.934	70 Yb 173.04
----------------------------	---------------------------	----------------------------	---------------------------	--------------------------	---------------------------	---------------------------	---------------------------	----------------------------	---------------------------	----------------------------	---------------------------	----------------------------	---------------------------

Actinides:

89 Ac 227.028	90 Th 232.038	91 Pa 231.036	92 U 238.029	93 Np 237.048	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)
----------------------------	----------------------------	----------------------------	---------------------------	----------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	---------------------------	---------------------------	---------------------------