BWAILA CLUSTER

2022/23 JCE END OF TERM ONE EXAMINATIONS

CHEMISTRY

(100 Marks)

Subject number: J038

Wednesday, 14th December 2022

Time Allowed: 2 hours

08:00 – 10:00AM

Instructions

1. This paper contains **12** printed pages. Please check.
2. Answer all the thirty three questions in the spaces provided
3. This paper contains **A**, **B** and **C**. For section **A**, encircle letter representing the right answer to each question. Sections **B** and **C** should be answered in spaces provided.
4. Use of non – programmable electronic calculators is allowed.
5. The maximum number of marks for each answer is indicated against each question.
6. In the table provided on this page, **tick** against the question number you have answered.

Question number	Tick if answered	Do not write in this column
1 - 20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		

SECTION A (20 Marks)

Answer all questions in this section

1. Which of the following is the general formula for alkanes?

A. C_nH_{2n+2W}

B. C_nH_{2n}

C. C_nH_{2n+1}

D. $C_nH_{2n}OH$

2. Which of the following compounds is a hydrocarbon?

A. C_2H_4OH

B. C_2H_4

C. C_2H_5Br

D. $C_2H_5Br_2$

3. Which branch of chemistry analyses the chemical nature and quantity of each of the substances present in a mixture?

A. Analytical chemistry

B. Biochemistry

C. Industrial chemistry

D. Organic chemistry

4. The correct definition of accuracy is ___.

A. The repetition of correct results

B. How close the results are to correct answer.

C. The measure of accuracy

D. The repetition of experiments.

5. Which of the following are stages in scientific investigation?

1. Identifying a problem
2. Formulation of a hypothesis
3. Testing data
4. Controlling errors

A. 1 and 4
B. 1 and 2
C. 2 and 3
D. 3 and 4

6. What is the percentage composition by mass of carbon in CH_4? (RAM C=12, H=1)

A. 25%

B. 48%

C. 75%

D. 92%

Table 1 shows atomic numbers and mass numbers of elements **Q, R, S** and **T**. Use it to answer **Questions 7** and **8**

Element	Atomic Number	Mass Number
Q	3	7
R	13	27
S	19	40
T	8	18

Table 1

7. Which element has 21 neutrons in its atom?

A. Q

B. R

C. S

D. T

8. Which elements are in the same period?

A. Q and R

B. Q and T

C. R and S

D. T and Q

9. The number of electrons present in valence shell of HALOGENS is_____.

A. A.1

B. B.5

C. C.3

D. D.7

10. 1 Atom Q has the atomic number 17. Its electron configuration is _____.

A. 2,8,7

B. 2,7,8

C. 2,3,7

D. 8,7,2

11. Which of the given element is a metalloid?

A. calcium

B. silicon

C. Argon

D. Lithium

12. What is the value of **X** in the equation below;

$$2Mg_{(s)} + O_{2(g)} \longrightarrow \mathbf{X}\ MgO_{(s)}$$

A. 4

B. 0

C. 1

D. 2

13. How many hydrogen atoms are there in **two** molecules of $(NH_2)_2CO$?

A. 2

B. 4

C. 6

D. 8

14. The process used to obtain pure water from sea water is called _____.

A. sedimentation

B. filtration

C. distillation

D. decantation

15. Write the number $9.63 \times 10°$ in ordinary notation.

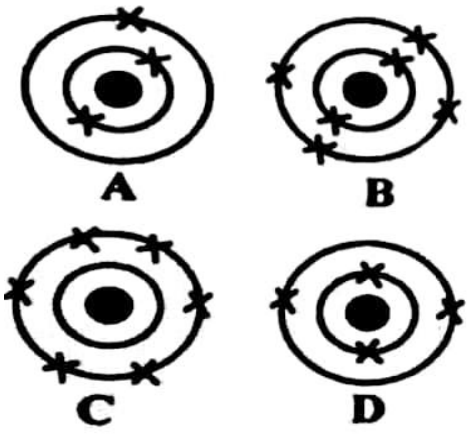
A. 9.63

B. 96.3

C. 0.963

D. 963

16. Which of the following atomic structures represents an alkali earth metal?



17. Which of the following is the correct set of acid properties.

A. Sour taste, corrosive, change litmus paper from red to blue

B. Sour taste, corrosive, change litmus paper from blue to red

C. Sweet taste, slippery, change litmus from blue to red

D. Sour taste, soapy, change litmus from blue to red

18. Which of the following can be used to determine the strength of an acid?

1. Universal indicator
2. Litmus Paper
3. Phenolphthalein indicator
4. Conductivity test

A. 1 and 2

B. 2 and 3

C. 3 and 4

D. 1 and 4

19. The name for Mg_3N_2 is _____.

A. Magnesium nitrate

B. Magnesium nitride

C. Trimagnesium dinitrogen

D. Magnesium nitrite

20. Electronegativity is the ability_____.

A. to gain electrons

B. of an atom to attract the shared pair of electrons

C. of an atom to lose electrons

D. to form negative ions

SECTION B (50 MARKS)

Answer all **ten** questions in this section

21. Sulphuric acid **(H_2SO_4)** reacts with a base sodium hydroxide **(NaOH)** to form sodium sulphate **(Na_2SO_4)** and water **(H_2O)**.

a. Write a balanced chemical equation for the reaction

(3 marks)

b. What type of reaction is represented by the equation above?

_____

(1 mark)

c. Briefly describe any **two** applications of the type of reactions in **Q21b**.

i. _____

_____

ii. _____

_____

(4 marks)

22. Lead nitrate reacts with sodium chloride according to the equation below:

$$\mathbf{Pb(NO_3)_2(aq) + NaCl(aq) \rightarrow PbCl_2(s) + NaNO_3(aq)}$$

a. What do the following symbols in the equation stand for?

i. (aq): _____

ii. (s): _____

(2 marks)

b. Calculate the mass of the reactants in the chemical equation for the reaction given above.

(RAM: Pb = 207.19; N = 14; O = 16; Na = 23; Cl = 35.5)

(2 marks)

23. a. State the **three** subatomic particles of an atoms.

_____

_____

_____

(3 marks)

b. Give **three** ways in which atoms attain stability.

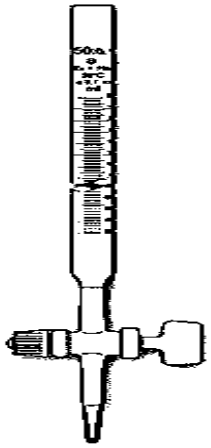
_____

_____

_____

(3 marks)

24. **Figure 1** below shows some of the apparatus used in a chemistry laboratory. Study them carefully and use them to answer questions that follow.



A

B

a. Name the following apparatus:

A: _____ (1 mark)

B: _____ (1 mark)

b. What is the function of the apparatus named **B** in the laboratory.

_____

(1 mark)

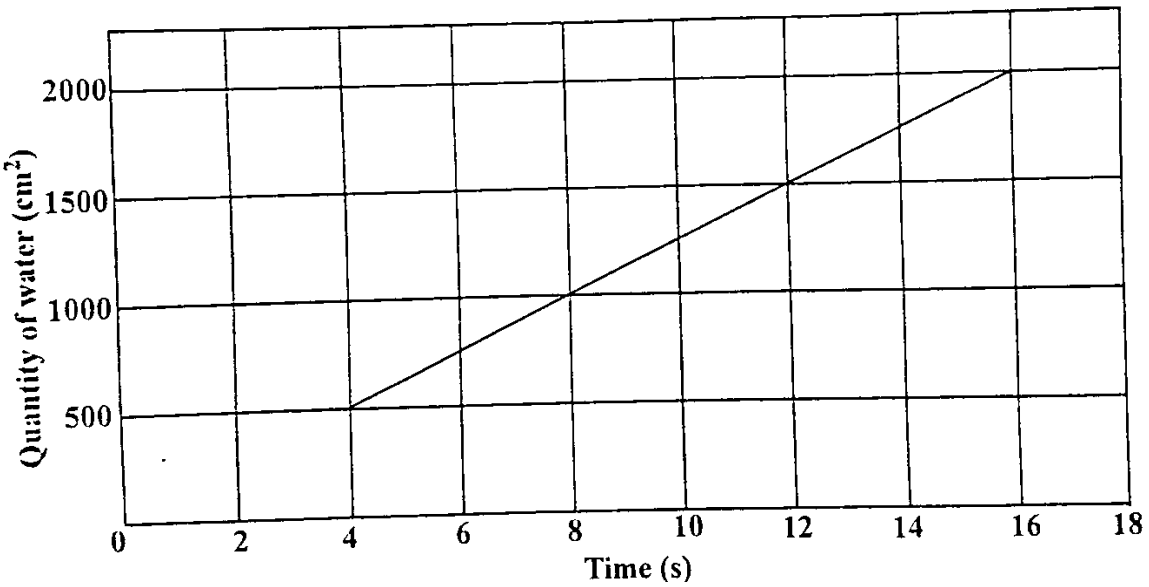
25. a. What is the difference between accuracy and precision?

_____

_____

(2 marks)

b. The graph below shows the quantity of water heated against time taken to heat water at **90°C.**



(i) What is the relationship between the quantity of water and time taken to heat water to **90°C?**

_____

_____

(1 mark)

(ii) What time would it take to heat **1125cm³** of water to **90°C ?**

_____

(1 mark)

26. a. With reasons arrange $^{7}_{3}Li$, $^{17}_{9}F$ *and* $^{24}_{12}Mg$ in order of increasing atomic radius.

_____

_____

_____

_____

_____

(3 marks)

b. Briefly, describe any one factor that affect the size of ionization energy of an atom.

_____

_____

(2 marks)

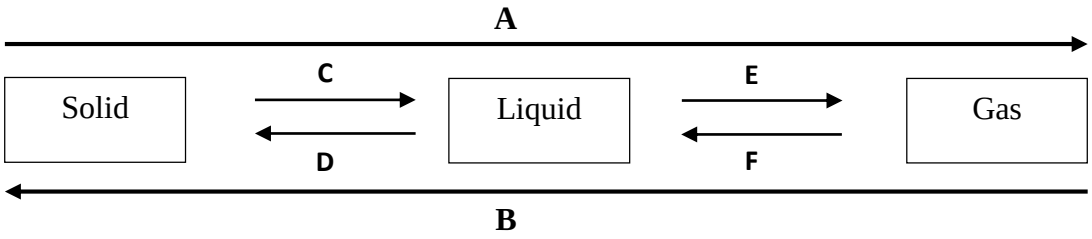
27. Matter is defined as anything that has mass and occupies space.

a. Apart from the three states of matter solid, liquid and gas, state any one other state of matter that you know.

_____

(1 mark)

b. The flow chart below shows the physical states of matter. Study it and answer the questions that follow.



i. Name the processes.

C: _____

E: _____

(2 marks)

ii. Give examples of substances that undergo process **A**.

_____

_____

(2 marks)

28. a. An element $^{26}_{13}\boldsymbol{X}$ and $^{32}_{16}\boldsymbol{Y}$ combine chemically.

i. Draw Cross and Dot diagrams for the reaction.

(3 marks)

ii. Write the chemical formula of the compound (show your working).

(2 Marks)

29. The electron configuration of an atom **X** is **2, 8, 3**

(a) (i) In which group is atom **X,** give a reason.

_____

_____

(2 marks)

(ii) In which period is atom **X,** Give a reason.

_____

_____

(2 marks)

(b) If the number of neutrons of atom **X** is **14**, Draw its atomic structure (show the sub atomic particles).

(3 Marks)

30. **Table 1** shows the first 20 elements of the periodic table.

H							He
Li	Be	B	C	N	O	F	Ne
Na	Mg	Al	Si	P	S	Cl	Ar
K	Ca						

(a) Write down the atomic number of **Si**.

_____

(1 mark)

(b) Work out the electron configuration of **K** given that its atomic number is **19.**

_____

(1 mark)

(c) How can aluminum ***(Al)*** attain an inert gas electron configuration?

_____

(1 mark)

SECTION C (30 MARKS)

Answer all **three** questions in this section

31. a. Describe how a local indicator can be prepared using tomato leaves.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

(6 marks)

b. Describe how pH of a water soluble solid can be determined.

_____
_____
_____
_____
_____

(4 marks)

32. With the aid of a well labelled diagram **(chromatogram)** describe an experiment that can be done to determine the purity of black ink.

(10 marks)

33. Describe an experiment that can be done to show that heating of ice is a physical change while heating of sugar is a chemical change.

(10 marks)

END OF QUESTIONS PAPER

NB: This paper contains 12 printed pages