

Name:..... Centre/Index No:

Signature:..... School:

545/1

CHEMISTRY

Paper 1

July/Aug. 2023

1½ hours



UGANDA TEACHERS' EXAMINATION SCHEME

**Uganda Certificate of Education
JOINT MOCK EXAMINATIONS**

CHEMISTRY

Paper 1

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

This paper consists of 50 objective type questions.

Attempt all questions.

You are required to write the correct answer; A, B, C or D in the boxes provided on the right hand side of each question.

Do not use pencils.

Mathematical tables, and silent non-programmable calculators may be used.

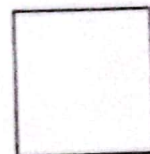
(Use; C = 12, H = 1, O = 16, Na = 23, Mg = 24, Al = 27)

1 mole of a gas occupies 22400cm³ s.t.p)

For Examiner's Use Only

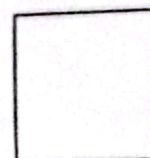
1. Which of the following is not likely to occur when a small piece of sodium metal is dropped on the surface of distilled water in a small beaker?

A. Hissing sound
B. Explosion
C. Steam given off
D. Yellow liquid



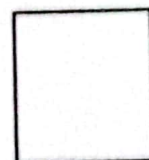
2. Elements P, Q, R, S have atomic numbers 2:8:4, 2:8:1, 2:4, 2:8:8:1 respectively; the order of reactivity of the elements with water starting with the most reactive is;

A. $P > R > Q > S$
B. $S > Q > P > R$
C. $R > P > S > Q$
D. $Q > S > R > P$



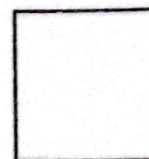
3. A neutral atom Y has atomic mass 16, but when charged Y^{2-} has 10 electrons, what is the number of neutrons in the charged atom Y^{2-} ?

A. 7
B. 14
C. 8
D. 13



4. Which one of the following metals is likely not to react with cold water?

A. Aluminium
B. Sodium
C. Calcium
D. Magnesium.



Turn Over

5. During electrolysis, electrons enter the electrolyte through;
- A. Both electrodes
 - B. Anode
 - C. Cathode
 - D. Cations
6. Aluminous flame of a Bunsen burner gives out more light than a non-luminous flame because a luminous flame;
- A. Contains white-hot carbon
 - B. Contains no white-hot carbon
 - C. The gas burns completely
 - D. Air enters fully and causes complete burning.
7. All these nitrates can be decomposed by heat to an oxide of metal, nitrogen and oxygen except;
- A. Zinc
 - B. Iron
 - C. Calcium
 - D. Sodium
8. When heated, the following substances will undergo physical change except
- A. Copper(II) hydroxide
 - B. Iodine
 - C. Ammonium chloride
 - D. Sulphur.

Turn Over

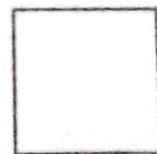
9. 80g of copper(II) sulphate were completely dissolved in 500cm³ of distilled water. The concentration of the solution in moles per litre can be given by

A. $\frac{80 \times 500}{160 \times 1000}$

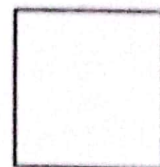
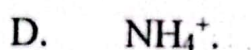
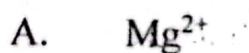
B. $\frac{160 \times 500}{80 \times 1000}$

C. $\frac{80 \times 1000}{160 \times 500}$

D. $\frac{160 \times 500}{80 \times 1000}$



10. Which one of the following ions can not precipitate with both ammonia and sodium hydroxide solutions?



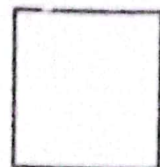
11. Which one of the following elements can not react with nitrogen?

A. Hydrogen

B. Zinc

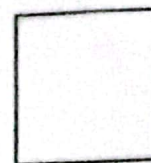
C. Magnesium

D. Lithium



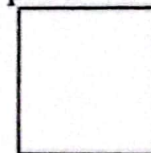
12. Which of the following metals is **not** suitable for extraction of iron from its ore by reduction?

- A. Lead
- B. Magnesium
- C. Calcium
- D. Zinc



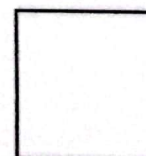
13. In exothermic reactions,

- A. The energy of the products is less than the energy of the reactants.
- B. The energy of the reactants is less than the energy of the products.
- C. The energy of the reactants is equal to the energy of the products.
- D. Both products and reactants produce excess energy



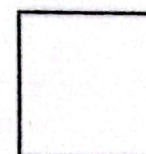
14. During saponification process, sodium chloride is used for the purpose of;

- A. Hydrogenating oil
- B. Converting oil to fat
- C. Add stearate
- D. Separate out soap.



15. Given the formula C_2H_4 , the formula is of

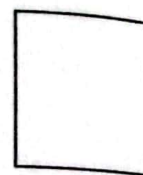
- A. An alkane
- B. An alkyl
- C. An alcohol
- D. An alkene



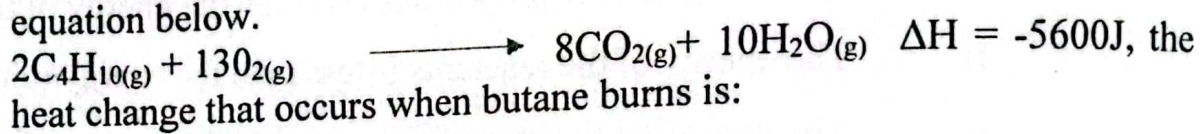
Turn Over

16. Which of the following is the electronic configuration is a sodium ion, Na^+ ?

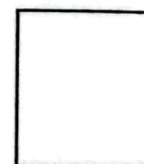
- A. 2:8:1
- B. 2:8
- C. 2:8:8
- D. 2:8:8:1



17. 23.6g of butane, C_4H_{10} , Molar mass 58g, burns in oxygen according to the equation below.



- A. -210kJ
- B. -36.20KJ
- C. -5.1610KJ
- D. -1139.3KJ



18. Hydrogen sulphide burns in excess oxygen to produce

- A. Water vapour and sulphur dioxide
- B. Hydrogen and sulphur dioxide
- C. Water vapour and sulphur trioxide
- D. Sulphuric acid and sulphur.



19. During the industrial preparation of nitric acid, in the first stage, ammonia and air are heated in presence of platinum catalyst, the nitrogenous product formed is;

- A. NH_3
- B. NO
- C. NO_2
- D. N_2O



20. The black solid formed when iron is heated strongly in oxygen is;

- A. Iron(II) oxide
- B. Hydrated iron(III) oxide
- C. Hydrated iron(II) oxide
- D. Tri iron tetra oxide.

☐

21. The number of moles in 25.0cm^3 of sodium hydroxide solution made by dissolving 4g of sodium hydroxide to make 250.0cm^3 is;

- A. 0.01
- B. 0.1
- C. 0.0025
- D. 0.025

☐

22. Which one of the following will not give a precipitate with sodium hydroxide solution?

- A. Cu^{2+}
- B. Ca^{2+}
- C. Zn^{2+}
- D. NH_4^+

☐

23. A chloride of Y contains 20.22% Y and 79.78% chloride, the empirical formula of the substance is; ($Y = 27$, $\text{Cl} = 35.5$)

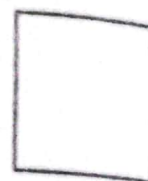
- A. YCl
- B. Y_3Cl
- C. YCl_3
- D. YCl_2

☐

Turn Over

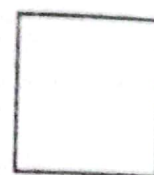
24. Which of the following acids is the weakest?

- A. Hydrochloric acid
- B. Sulphuric acid
- C. Carbonic acid
- D. Nitric acid



25. Which one of the following is made the anode during electrolysis of dilute sulphuric acid?

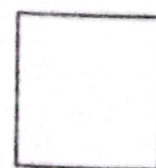
- A. Platinum
- B. Carbon
- C. Copper
- D. Zinc



26. Given the equation below;

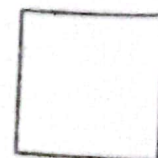
$\text{Mg}_{(s)} + \text{SO}_{2(g)} \longrightarrow \text{MgO}_{(s)} + \text{S}_{(g)}$. In the above equation, what property of sulphurdioxide is exercised?

- A. Oxidizing property
- B. Reducing property
- C. Redox property
- D. De hydrating property.

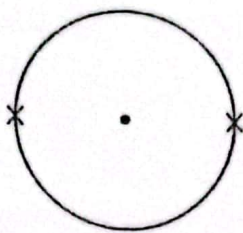


27. Which one of the following contains the highest percentage of carbon?

- A. $\text{Al}_2 \text{CO}_3$
- B. Na CO_3
- C. $\text{H}_2 \text{CO}_3$
- D. $\text{Mg (HCO}_3)_2$.



28. The atomic structure of an atom X is shown below;



To which group of periodic table is the atom X?

- A. I
- B. VI
- C. 0
- D. II

☐

29. During a neutralization reaction, 25.00cm^3 of 0.05M sodium hydroxide solution required 25.00cm^3 of 0.1M solution of an acid H_nX , for complete neutralization. The value of n in H_nX is;

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

☐

30. In a neutral atom, the number of protons is always equal to the number of electrons, if an atom W has its ion as W^{2-} , it means,

- A. Ion W^{2-} has two protons less than the number of electrons
- B. Ion W^{2-} has two electrons less than the number of protons.
- C. Ion W^{2-} has two electrons left to fill up its outer most orbital.
- D. Ion W^{2-} has two proton and two electrons in excess.

☐

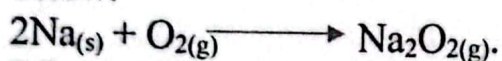
Turn Over

31. Which one of the following is likely to be the correct chemical formula for bauxite?

- A. $\text{Al}_2(\text{SO}_4)_2$
- B. Al_2CO_3
- C. $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$
- D. $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$

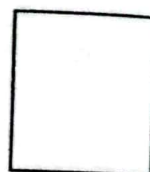


32. When burnt in excess oxygen, sodium burns according to the equation below.



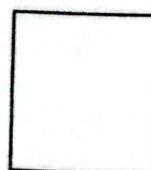
What will be the volume of gas required to produce 31.2g of sodium peroxide at s.t.p?

- A. 31200cm^3
- B. 56000cm^3
- C. 8960cm^3
- D. 17920cm^3



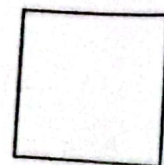
33. During the laboratory preparation of nitric acid, the distillate appears yellow, this is due to;

- A. Presence of dissolved nitrogen dioxide
- B. Corrosive nature of nitric acid.
- C. Presence of excess oxygen in the reaction
- D. The funning nature of nitrogen dioxide.



34. When a sample of a salt was heated in a dry test-tube, a brown solid residue when cold was observed, the cation in the salt is likely to be;

- A. Zn^{2+}
- B. Fe^{3+}
- C. Fe^{2+}
- D. Cu^{2+}



35. To which group and period does an atom with atomic number 15 belong?

- A. Group III period 3
- B. Group III period 5
- C. Group IV period 5
- D. Group V period 3

☐

36. In a neutralization reaction, 18.25cm^3 of 0.05M sulphuric acid reacted exactly with 25.00cm^3 of sodium hydroxide solution made by dissolving 3.2g of crude solid sample to make 1dm^3 solution, the molarity of the pure sodium hydroxide was calculated to be 0.073M , the percentage impurity of sodium hydroxide is

- A. 10.9%
- B. 12.50%
- C. 8.75%
- D. 91.25%


☐


37. An oxide of metal W contains 32.94% W by mass, the empirical formula of the oxide is ($W = 27$, $O = 16$)


- A. W O_2
- B. $\text{W}_3 \text{O}_2$
- C. W O
- D. $\text{W}_2 \text{O}_3$

☐

Turn Over

38. Given atomic numbers of elements E, F, G, H are 11, 16, 17 and 9 respectively, which pairs of elements will not form ionic bonds?
- A. E and F
 - B. F and H
 - C. G and E
 - D. E and H
- 

39. Which one of the following methods is not suitable for collecting ammonia gas in the laboratory?
- A. Over water in a gas jar
 - B. Upward delivery
 - C. Downward displacement of air
 - D. Using a syringe
- 

40. Which one of the following gases is not colourless?
- A. Sulphur dioxide
 - B. Carbon dioxide
 - C. Nitrogen dioxide
 - D. Hydrogen sulphide
- 

Each of the questions 41 to 45 consists of an assertion (statement) on the left-hand side and a reason on the right-hand side

SELECT:

- A. If both the assertion and the reason are true statements and the reason is a correct explanation of the assertion.
- B. If both the assertion and the reason are true statements but the reason is not a correct explanation of the assertion.
- C. If the assertion is true but the reason is an incorrect statement.
- D. If the assertion is not correct but the reason is a correct statement.

INSTRUCTION SUMMARY

Assertion	Reason
A. True	True (reason is a correct explanation)
B. True	True (reason is not a correct explanation)
C. True	Incorrect
D. Incorrect	Correct.

41. Elements in group I
are generally less
reactive than elements
group II

BECAUSE

Elements in group I
lose one electron
for bonding during chemical
reactions

☐

42. Phosphorus trichloride
is a non-electrolyte

BECAUSE

Phosphorus trichloride
is covalent

☐

43. Both copper and lead
react with
cold water

BECAUSE

Both copper and lead
are metals

☐

44. In electrovalent bonding,
a metallic atom loses its
valency electron(s) to
a non-metallic atom

BECAUSE

Non-metallic atoms
have less valency
electrons than
metallic atoms.

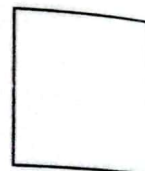
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Turn Over

45. When magnesium is burnt in oxygen and the solid product dissolved in water, then the resultant solution tested with phenolphthalein indicators, the solution turns pink.

BECAUSE

The resultant solution contains higher concentration of H^+ , than OH^- ions.



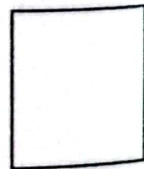
In each of the questions 46 to 50, one or more of the answers given may be correct, read each question carefully and indicate the correct answer A, B, C or D according to the following instructions;

SELECT:

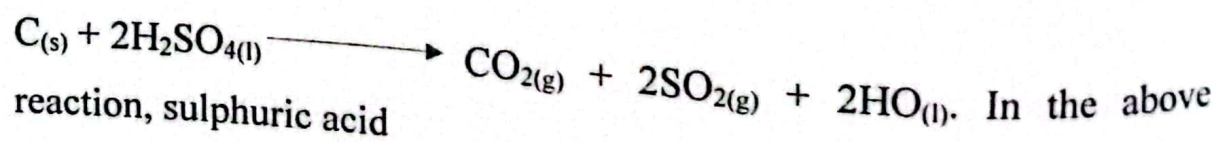
- A. If 1, 2, 3 only are correct
- B. If 1, 3 only are correct
- C. If 2, 4 only are correct
- D. If 4 only is correct.

46. During the industrial manufacture of ammonia by harber process;

- 1. Iron catalyst is used
- 2. The reaction is endothermic
- 3. Heat energy is evolved
- 4. Soda lime is never used.



47. Given the reaction between carbon and hot concentrated sulphuric acid below



1. Dehydrates carbon
2. Is oxidized to sulphurdioxide
3. Acts as a reducing agent
4. Oxidises carbon

☐

48. Which of the following is true about pure ethanol?

1. Can undergo addition reaction
2. Is an alcohol
3. It is ionic
4. Boils below 80°C.

☐

49. Which of these cations form precipitates insoluble in excess sodium hydroxide solution?

1. Ca^{2+}
2. Cu^{2+}
3. Mg^{2+}
4. Zn^{2+}

☐

50. Halogens have the following properties in common.

1. Accept electrons from metal in bonding
2. Lack only one electron to form an octet.
3. Possess seven valency electrons
4. Are strong electrolytes.

☐

END