

Candidate's Name:
Signature:

545/1

Chemistry Theory

Paper 1

July /August 2023

1½ Hours



KAYUNGA SECONDARY SCHOOLS EXAMINATIONS COMMITTEE (KASSEC)
JOINT MOCK EXAMINATION 2023
Uganda Certificate of Education

CHEMISTRY

PAPER ONE

1 Hour 30 minutes

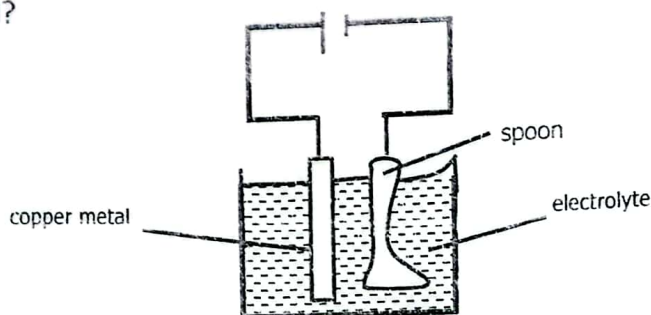
INSTRUCTIONS TO CANDIDATES.

- Answer all questions in this paper.
- Write the correct letter of your own choice in the boxes provided.
- Do not use a pencil.

FOR EXAMINERS' USE ONLY	
MARKS	

Turn Over

1. The diagram below shows how a spoon is electroplated. What is the name of the electrolyte used?



- A. Aqueous copper(II) sulphate. ☐
- B. Dilute hydrochloric acid
- C. Molten zinc (II) chloride
- D. Aqueous sodium chloride
2. Some fuels have to be burnt in oxygen for energy to be released. To which fuel does this statement not apply? ☐
- A. Hydrogen
- B. Coal
- C. Methane
- D. Uranium
3. Iron(II) ions in FeO react with oxygen to form Fe₂O₃. Which statement about the iron is correct? ☐
- A. Iron(II) ions are oxidized because they gain oxygen.
- B. Iron(II) ions are reduced because they lose oxygen
- C. Iron(III) ions are oxidized because they gain oxygen
- D. Iron(III) ions are reduced because they lose oxygen.
4. The formula of the chloride of metal M is MC_l. The formula of the nitrate of M is. ☐
- A. MNO₃
- B. M₂NO₃
- C. M(NO₃)₃
- D. M₃(NO₃)₂

5. Which one of the following is formed when magnesium burns in carbon dioxide?

- A. Carbon monoxide
- B. Carbon
- C. Magnesium nitride
- D. Magnesium hydrogen carbonate.

☐

6. Calcium hydrogen carbonate is one of the compounds that cause temporary hardness of water. When heated it decomposes according to the equation.



What volume of carbon dioxide will be evolved at s.t.p when 54g of the hydrogen carbonate are heated. (Ca = 40, H=1, C= 12, O=16), molar volume of a gas at s.t.p = 22.4dm³).

- A. $\frac{2 \times 22.4 \times 54}{162} \text{ dm}^3$
- B. $\frac{162}{2 \times 22.4} \text{ dm}^3$
- C. $\frac{162}{54 \times 22.4} \text{ dm}^3$
- D. $54 \times 22.4 \text{ dm}^3$

☐

7. Which cation forms a green precipitate with sodium hydroxide solution?

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

☐

8. The hydroxide that will turn brown when exposed to air is?

- A. Copper(II) hydroxide
- B. Lead (II) hydroxide
- C. Iron(II)hydroxide
- D. Sodium hydroxide.

☐

9. Which of the following pairs of metals make the alloy called bronze?

- A. Zinc and lead
- B. Copper and zinc
- C. Copper and tin
- D. Lead and tin

☐

10. Which of these metals is extracted by electrolysis? ☐
- A. Zinc
 - B. Copper
 - C. Sodium
 - D. Lead
11. Permanent hard water can be softened by ☐
- A. Adding calcium hydroxide
 - B. Boiling
 - C. Adding sodium carbonate
 - D. Adding sodium hydroxide.
12. 0.02 moles of calcium chloride are dissolved in water to make a 250cm³ solution. What is the molarity of the solution. ☐
- A. 0.08M
 - B. 0.16M
 - C. 0.04M
 - D. 0.02M
13. An element x can be represented as $^{235}_{92}\text{X}$. The number of electrons is ☐
- A. 92
 - B. 235
 - C. 133
 - D. 327
14. sulphur is extracted from the ground by frasc process .Which of the following is pumped into the ground? ☐
- A. Super heated water and hot air
 - B. Super heated water and steam
 - C. Hot water and hot air
 - D. Hot water and air

15. Which one of the following is not a characteristics property of hydrogen sulphide?

- A. It forms a black precipitate with lead ethanoate solution.
- B. It is poisonous.
- C. It is acidic to litmus
- D. It forms a black precipitate with zinc nitrate solution.

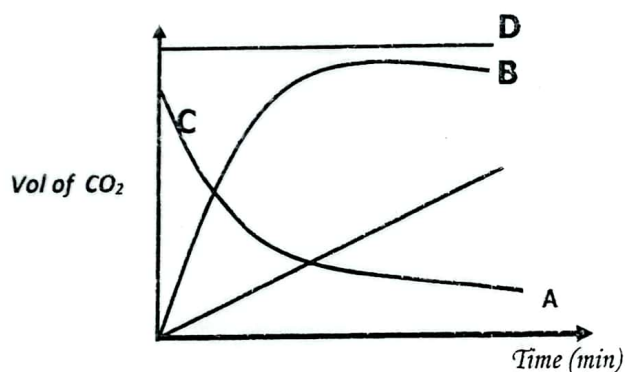
☐

16. The rate of reaction between zinc and dilute hydrochloric acid can be increased by

- A. Concentrated hydrochloric acid
- B. Addition of more zinc granules
- C. Decreasing temperature
- D. Using powdered zinc instead of zinc granules.

☐

17. Which of the following graphs shows the change of the volume of carbon dioxide liberated with time when calcium carbonate is reacted with dilute hydrochloric acid?

☐

18. The catalyst used in the manufacture of ammonia is

- A. Platinum
- B. Vanadium
- C. Iron
- D. Lead oxide

☐

19. The action of dilute nitric acid on metals differs from that of dilute hydrochloric acid because.

- A. Nitric acid is higher in the electrochemical series.
- B. Nitric acid is partially ionized.
- C. Nitric acid is an oxidizing agent
- D. Hydrochloric acid is completely ionized.

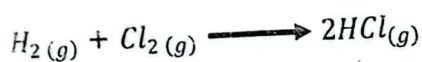
☐

20. Chlorine has atomic number 17. Which of the following is the correct formula of a chloride of X with a valency of 3?

☐

- A. XCl
- B. X_3Cl
- C. XCl_3
- D. X_2Cl_3

21. Hydrogen reacts with chlorine according to the following equations



What is the volume of hydrogen chloride formed when 30cm^3 of hydrogen are reacted with 50cm^3 of chlorine at room temperature and pressure?

☐

- A. 20cm^3
- B. 40cm^3
- C. 60cm^3
- D. 80cm^3

22. Which one of the following anions will react with silver nitrate solution to give a white precipitate soluble in excess aqueous ammonia?

☐

- A. NO_3^-
- B. CO_3^{2-}
- C. SO_4^{2-}
- D. Cl^-

23. Which one of the following is a monomer of polyethene?

☐

- A. Glucose
- B. Isoprene
- C. Amino acid
- D. Ethene

24. Which one of the following gases is an oxidizing agent?

☐

- A. CO
- B. Cl_2
- C. H_2S
- D. NH_3

25. Which one of the following substance is produced at the cathode when dilute solution of potassium chloride is electrolyzed using carbon electrodes?

- A. Chlorine
- B. Oxygen
- C. Potassium
- D. Hydrogen

☐

26. An anhydrous salt R has a relative formula mass of 158 and forms a hydrated salt with formula $R \cdot nH_2O$. 79g of R combined with 45g water. What is the value of n? (H=1, O=16)

- A. 2
- B. 5
- C. 3
- D. 10

☐

27. One advantage of hard water is that

- A. It does not contain bacteria
- B. It forms lather readily with soap
- C. It contains calcium compounds which help to form healthy bones.
- D. It forms scales in boilers which prevent the boilers from leaking.

☐

28. Which one of the following does not produce a white precipitate with lead(II) nitrate?

- A. Dilute sulphuric acid
- B. Dilute hydrochloric acid
- C. Excess ammonia solution
- D. Excess sodium hydroxide solution.

☐

29. Carbon monoxide can be obtained from carbon dioxide by

- A. Heating carbon dioxide in the absence of air.
- B. Passing carbon dioxide over heated carbon
- C. Heating a mixture of carbon dioxide and steam
- D. Passing carbon dioxide over heated copper

☐

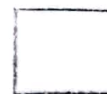
30. Which of the following metals can be extracted by reduction of the oxide with carbon?

- A. Zinc
- B. Potassium
- C. Aluminium
- D. Magnesium

☐

31. In the laboratory preparation of chlorine, concentrated hydrochloric acid is heated with.....

- A. Sodium chloride crystals
- B. Manganese(IV) oxide
- C. Copper(II) chloride crystals
- D. Lead (II) oxide



32. When heated strongly, potassium nitrate decomposes according to the following equation.



The volume of oxygen at s.t.p that can be obtained by heating 5g of potassium nitrate is

(K = 39, O = 16, N = 14, 1 Mole of a gas occupies 22.4 litres at s.t.p)

A. $\frac{22.4 \times 5}{202} \text{ l}$

B. $\frac{22.4 \times 5}{101} \text{ l}$

C. $\frac{5 \times 202}{22.4} \text{ l}$

D. $\frac{5 \times 101}{22.4} \text{ l}$



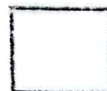
33. Metal M was dissolved in dilute nitric acid and the solution formed was evaporated to dryness and then heated strongly until there was no further change. The residue was yellow when hot and white when cold. Metal M was?

- A. Lead
- B. Zinc
- C. Aluminum
- D. Iron



34. 15.0 cm³ of a 0.1M solution of an acid was completely neutralized by 45.0cm³ of a 0.1M sodium hydroxide solution .The basicity of the acid was.

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



35. Which one of the following compound does not give off carbon dioxide when strongly heated
- A. Sodium hydrogen carbonate
 - B. Sodium carbonate
 - C. Calcium carbonate
 - D. Calcium hydrogen carbonate
36. Concentrated nitric acid was added to an aqueous solution of iron(II)sulphate .What was observed?
- A. A brown ring
 - B. A pale yellow solution
 - C. A green solution
 - D. A green precipitate
37. Water is formed when hydrogen gas burns in oxygen. The process taking place is
- A. Liquefaction
 - B. Synthesis
 - C. Decomposition
 - D. Distillation
38. Which one of the following elements combines with nitrogen?
- A. Calcium
 - B. Iron
 - C. Zinc
 - D. Copper
39. Compounds from which all water of crystallization has been removed.
- A. Amorphous
 - B. Non-crystalline
 - C. Efflorescent
 - D. Anhydrous
40. The name of $\text{H}_2\text{C}=\text{CH}_2$ is
- A. Hydrogen carbonate
 - B. Ethene
 - C. Propane
 - D. Ethene

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. Indicate the answer A,B,C and D according to the table below.

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

41. In electrolysis of solid sodium chloride, sodium ions are discharged at the cathode because sodium ions are positively charged. ☐

42. Rubber is more elastic than polythene because rubber is a natural polymer. ☐

43. Carbon dioxide puts off burning magnesium because carbon dioxide does not support combustion. ☐

44. Zinc is used to galvanise iron because zinc is passive in air ☐

45. 2M hydrochloric acid is stronger than 2M ethanoic acid because hydrochloric acid is fully ionized. ☐

In each of the following questions 46 to 50, one or more of the answers may be correct. Read each question carefully and indicate the correct answers A,B,C or D according to the following.

A	B	C	D
If 1,2,3 only correct	1,2 only correct	2,4 only correct	4 only correct

46. Which of the following compounds are responsible for causing fur in kettles used for boiling water? ☐

1. Calcium sulphate
2. Calcium carbonate
3. Magnesium sulphate
4. Magnesium carbonate

47. The following are (is) acids

☐

1. $\text{Mg}(\text{OH})_2$
2. NaCl
3. NaOH
4. HCl

48. Graphite

☐

1. Is an allotrope of carbon
2. is an isotope of carbon
3. Conducts electricity
4. Consists of atoms arranged in a tetrahedral shape.

49. Which of the following compound has/have a multiple bond?

☐

1. C_4H_{10}
2. C_2H_2
3. C_2H_6
4. C_2H_4

50. When a burning piece of magnesium is lowered into a jar of carbon dioxide, the following observation (s) is /are made

1. The magnesium continues to burn
2. Black particles are formed
3. A white ash is formed
4. The burning magnesium is extinguished.

☐

END