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CHEMISTRY

Paper 1

Monday 14<sup>th</sup> August 2023 (Morning)

1 hour 30 minutes

**ACHOLI SECONDARY SCHOOLS EXAMINATIONS COMMITTEE***Uganda Certificate of Education*

Joint Mock Examinations, 2023

**CHEMISTRY**

Paper 1

1 hour 30 minutes

**INSTRUCTIONS TO CANDIDATES:**

- ✓ This paper consists of 50 objective type questions. Answer **all** the questions.
- ✓ You are required to write the correct alternative; A, B, C or D in the box provided on the right-hand side of each question.
- ✓ Use a pen and write clearly.
- ✓ Do not use pencil.

For Examiner's Use Only

1. Which one of the following substances will undergo a chemical change when strongly heated?  
A. Sodium carbonate      B. Iodine      C. Iron (III) chloride      D  
D. Copper (II) carbonate
2. Which one of the following mixtures cannot be separated by fractional distillation method?  
A. Petrol and diesel      B. Paraffin and water  
C. Water and ethanol      D. Air      B
3. Which one of the following substances when exposed to the atmosphere for a few days will turn into liquid?  
A. Sodium carbonate      B. Calcium carbonate  
C. Zinc sulphate      D. Zinc chloride      D
4. Which one of the following pairs of solutions when mixed will show apparent loss in final mass?  
A. Lead (II) nitrate and potassium iodide  
B. Silver nitrate and sodium chloride  
C. Lead (II) nitrate and dilute sulphuric acid  
D. Sodium carbonate and dilute hydrochloric acid      D
5. The volume of hydrogen gas produced by the reaction between zinc and sulphuric acid can be increased by:  
A. diluting the acid      B. using cold acid  
C. crushing the zinc into small pieces      D. adding more acid as catalyst      C
6. The electronic configuration of an atom of element G is 2:8:6. The compound formed between G and hydrogen:  
A. reacts with damp sulphur dioxide to form a yellow solid  
B. dissolves in water to form an alkaline solution  
C. dissolves in water to form a neutral solution  
D. is a solid with high melting point      A
7. Some sodium hydroxide solution was added to a solution of nitrate Q. On warming the mixture, a colourless gas that fumes with concentrated hydrochloric acid was given out. Q could be:  
A. lead (II) nitrate      B. ammonium nitrate  
C. sodium nitrate      D. silver nitrate      B
8. The following pairs of ions in solution give the same observations when solutions of sodium hydroxide and ammonium hydroxide are added.  
A.  $\text{Zn}^{2+}$  and  $\text{Pb}^{2+}$       B.  $\text{Al}^{3+}$  and  $\text{Zn}^{2+}$       C.  $\text{Al}^{3+}$  and  $\text{Pb}^{2+}$       D.  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$       C

9. Which of the following metals is iron coated with to make galvanised iron?  
 A. Aluminium      B. Magnesium      C. Tin      D. Zinc

D

10. Which one of the following anions forms a white precipitate when lead (II) nitrate is added but dissolves on warming and reappears on cooling?  
 A.  $\text{Cl}^-$       B.  $\text{SO}_4^{2-}$       C.  $\text{NO}_3^-$       D.  $\text{CO}_3^{2-}$

A

11. The following gases decolourises purple acidified potassium permanganate except:  
 A. ethene      B. chlorine      C. sulphur dioxide      D. ethane

D

12. 18.0 cm<sup>3</sup> of 0.2M sodium hydroxide solution were required to neutralise 60 cm<sup>3</sup> of an acid  $\text{H}_2\text{X}$  containing 5.8g of acid per litre of solution. The formula mass of X is:  
 [Na = 23, O = 16, H = 1]  
 A. 88      B. 95      C. 96      D. 114

free

13. When ethene gas is compressed in a steel vessel at a high temperature, a white waxy solid is formed on the sides of the vessel. This white solid has a relative molecular mass of more than 10,000. The type of reaction that has taken place is:  
 A. cracking      B. saponification      C. polymerisation      D. fermentation

C

14. When sodium hydrogen carbonate was heated, it decomposes according to the equation below:



When 21.0g of the hydrogen carbonate were completely decomposed, the volume in litre of the carbon dioxide evolved at stp was:

[H = 1, C = 12, O = 16, Na = 23, 1 mole of a gas occupies 22.4 litres at stp]

- A.  $\left(\frac{21.0 \times 22.4}{168 \times 2}\right)$  litres      B.  $\left(\frac{168 \times 2}{21.0 \times 22.4}\right)$  litres  
 C.  $\left(\frac{21.0 \times 22.4}{84 \times 2}\right)$  litres      D.  $\left(\frac{84 \times 2}{21.0 \times 22.4}\right)$  litres

C

15. The following gases can be dried using concentrated sulphuric acid except:  
 A. sulphur dioxide      B. hydrogen sulphide  
 C. carbon monoxide      D. hydrogen chloride

B

16. Iron reacts with dilute sulphuric acid according to the equation below:



The mass of iron (II) sulphate formed when excess sulphuric acid reacts with 16.8g of iron is:

[Fe = 56, S = 32, O = 16]

- A. 45.6g      B. 16.8g      C. 50.4g      D. 6.189g

A



17. When dry air was passed through sodium hydroxide solution and then over heated copper metal, nitrogen was finally obtained. The role of sodium hydroxide solution was to:
- A. react with water vapour      B. remove oxygen  
C. provide steam to react with copper      D. absorb carbon dioxide
18. The following gases are major atmospheric pollutants except:
- A. carbon monoxide      B. sulphur dioxide  
C. carbon dioxide      D. nitrogen dioxide
19. The mass of  $96\text{cm}^3$  of a gaseous hydrocarbon Z at room temperature is 0.224g. What is the molecular formula of the hydrocarbon if it contains 85.7% carbon?
- A.  $\text{C}_4\text{H}_8$       B.  $\text{C}_2\text{H}_6$       C.  $\text{C}_2\text{H}_4$       D.  $\text{CH}_2$
20. Ammonium salts are used as nitrogen fertilisers. The ammonium salt that would best be used as a fertiliser can be:
- A.  $(\text{NH}_4)_3\text{PO}_4$       B.  $(\text{NH}_4)_2\text{SO}_4$       C.  $\text{NH}_4\text{Cl}$       D.  $\text{NH}_4\text{NO}_3$
21. Sulphur dioxide was bubbled through water. The resultant solution:
- A. is a bleaching agent  
B. is an oxidising agent  
C. turns red litmus paper blue  
D. liberates oxygen when exposed to sunlight
22. The reaction between concentrated sulphuric acid and sucrose to form a black spongy substance is:
- A. oxidation      B. dehydration      C. reduction      D. hydration
23. Lead (II) bromide does not conduct electricity while in solid state but conducts electricity while in molten state. This is because lead (II) bromide:
- A. is a covalent compound in a solid state  
B. exists as atoms in solid state  
C. has moving electrons in molten state  
D. exists as moving charged particles in molten state
24. In the Contact Process for the manufacture of sulphuric acid, one step involve the oxidation of sulphur dioxide as shown below:
- $$2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \leftrightarrow 2\text{SO}_3(\text{g})$$
- Which change would increase the amount of sulphur trioxide produced at equilibrium?
- A. Increase the temperature      B. Decreasing the temperature  
C. Decreasing the pressure      D. Adding a catalyst
25. Which one of the following salts when heated decomposes into its respective metal, nitrogen dioxide and oxygen gas?

- A. Silver nitrate      B. Sodium nitrate      C. Calcium nitrate  
D. Copper (II) nitrate

A

26. Which one of the following pairs of cations can be confirmed by addition of excess ammonia solution?

- A.  $\text{Pb}^{2+}$  and  $\text{Zn}^{2+}$       B.  $\text{Zn}^{2+}$  and  $\text{Al}^{3+}$       C.  $\text{Zn}^{2+}$  and  $\text{Cu}^{2+}$       D.  $\text{Pb}^{2+}$  and  $\text{Cu}^{2+}$

C

27. Hydrochloric acid reacts with sodium hydroxide according to the equation:



Which one of the following is the volume of a 0.5M hydrochloric acid required to neutralise completely with 20.0 cm<sup>3</sup> of a 0.2M sodium hydroxide solution?

- A. 8 cm<sup>3</sup>      B. 80 cm<sup>3</sup>      C. 20 cm<sup>3</sup>      D. 10 cm<sup>3</sup>

A

28. Ammonia burns in oxygen according to the equation below:



The maximum volume of oxygen required to burn completely 40 cm<sup>3</sup> of ammonia is:

- A.  $\left(\frac{3 \times 40}{4}\right) \text{ cm}^3$       B.  $\left(\frac{3 \times 4}{30}\right) \text{ cm}^3$   
C.  $\left(\frac{4 \times 40}{3}\right) \text{ cm}^3$       D.  $(4 \times 3 \times 40) \text{ cm}^3$

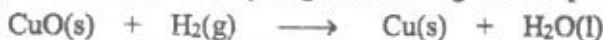
A

29. The followings are not the properties of chlorine except:

- A. it is less denser than air      B. it turns moist red litmus paper blue  
C. it displaces fluorine from its solution      D. it is a strong oxidising agent

D

30. Copper (II) oxide reacts with hydrogen according to the equation below:



The mass of copper metal formed when 50 cm<sup>3</sup> of hydrogen gas is reacted completely with copper (II) oxide is:

[Cu = 64, O = 16, H = 1, 1 mole of a gas occupies 24 dm<sup>3</sup> at rtp]

- A.  $(64 \times 5 \times 2400) \text{ g}$       B.  $\left(\frac{64 \times 5}{2400}\right) \text{ g}$   
C.  $\left(\frac{2400 \times 64}{5}\right) \text{ g}$       D.  $\left(\frac{2400 \times 5}{64}\right) \text{ g}$

B

31. During the manufacture of soap, sodium chloride is added to the mixture to:

- A. increase the volume of soap  
B. increase the solubility of the soap in water  
C. decrease the solubility of the soap  
D. reduce the density of the soap

C

32. The process of converting glucose to ethanol during manufacture of alcohol is called:  
A. polymerisation    B. dehydration    C. hydrogenation    D. fermentation
33. Which one of the following salts is prepared by double decomposition method?  
A. Sodium carbonate    B. Potassium carbonate  
C. Lead (II) nitrate    D. Lead (II) chloride
34. The following observations are true when copper (II) sulphate solution is electrolysed using copper electrodes except:  
A. the colour of the solution remains blue    B. the colour of the solution fades away  
C. the size of cathode increases    D. the size of the anode decreases
35. Which one of the following reagents can be used to distinguish ethane gas from ethene gas?  
A. Calcium hydroxide solution    B. A glowing splint  
C. Potassium permanganate    D. Litmus paper
36. Which one of the following biogas is produced in the sedimentation tank during sewage treatment?  
A. Ethane    B. Methane    C. Ethene    D. Propane
37. The process of obtaining sulphur from underground is referred to as:  
A. Frasch process    B. Contact process  
C. Haber process    D. Vulcanisation process
38. Which one of the following elements is added during hardening of natural rubber?  
A. Silicon    B. Potassium    C. Phosphorus    D. Sulphur
39. Which one of the following ions in solution forms a yellow precipitate when potassium iodide solution is added?  
A.  $\text{Ca}^{2+}$     B.  $\text{Cu}^{2+}$     C.  $\text{Pb}^{2+}$     D.  $\text{Pt}^{2+}$
40. Which one of the following produces large volume of carbon dioxide when added to calcium carbonate?  
A. 2M sulphuric acid solution    B. 2M hydrochloric acid solution  
C. 5M ethanoic acid solution    D. 5M phosphoric acid solution

Each of the following questions 41 to 45 consists of an assertion (statement) on the left hand side and a reason on the right hand side. Select as follows:

- A. If both assertion and the reason are true statements and the reason is the correct explanation of the assertion.



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

INSTRUCTIONS SUMMARISED		
SELECTION	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. Water can be separated from its mixture with paraffin using a separating funnel because water and paraffin have difference in their boiling points B
42. In the manufacture of sulphuric acid by Contact process, sulphur trioxide is bubbled through concentrated sulphuric acid not water because sulphuric acid has high affinity for water B
43. Hydrogen chloride gas dissolved in methyl benzene does not produce carbon dioxide when added to a carbonate salt but produces the gas when it is dissolved in water because hydrogen chloride gas dissolved in methyl benzene exists in molecular form A
44. Chlorine water when left exposed to sunlight produces bubbles of a colourless gas because chlorine water has a bleaching power B
45. When zinc powder is added to copper (II) sulphate solution, the colour of the solution gradually turns colourless because copper is more reactive than zinc C

In each of the questions 46 to 50, one or more of the answers given may be correct. Read each question carefully and then indicate the correct answer according to the following:

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

SUMMARY OF INSTRUCTIONS			
A	B	C	D
1, 2, 3 only correct	1, 3 only correct	2, 4 only correct	4 only correct

46. Which one of the following is formed when chlorine is bubbled through hot concentrated sodium hydroxide solution?

1.  $\text{H}_2\text{O}$                       2.  $\text{NaCl}$                       3.  $\text{NaClO}_3$                       4.  $\text{NaOCl}$

A

47. Which one of the following is / are true about polyethene?

1. It is biodegradable                      2. It is a synthetic polymer  
 3. It is a thermosetting plastic                      4. It can be recycled

C

48. Which one of the following substances is / are formed when ammonia is burnt in excess oxygen in the presence of a catalyst?

1.  $\text{NO}$                       2.  $\text{N}_2$                       3.  $\text{NO}_2$                       4.  $\text{N}_2\text{O}$

B

49. Which one of the following ions in solution causes hardness in water?

1.  $\text{Mg}^{2+}$                       2.  $\text{Pb}^{2+}$                       3.  $\text{Ca}^{2+}$                       4.  $\text{Zn}^{2+}$

B

50. The main component of air are / is:

1. carbon monoxide                      2. carbon dioxide                      3. rare gases                      4. Nitrogen

D

END