

Name.....Centre/Index No...../.....
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545/1
CHEMISTRY
Paper 2
August, 2023
2 hours



JINJA JOINT EXAMINATIONS BOARD

Uganda Certificate of Education

MOCK EXAMINATION –AUGUST, 2023

CHEMISTRY

Paper 1

1 hour 30 Minutes

INSTRUCTIONS TO CANDIDATES

- ✓ This paper consists of 50 objectives – type questions,
- ✓ Answer all questions
- ✓ You are provided to write the correct answer: A, B, C or D in blue or black ink in the box provided on the right-hand side of each question.
- ✓ Do not use pencil. Any questions answered in pencil will not be marked.

FOR EXAMINER'S USE ONLY

1. Fractional crystallization is a method used to Separate salts with different,
- A. Molecular mass
 - B. Boiling points
 - C. Densities
 - D. Solubilities
2. Fused calcium chloride when exposed to air changes from a solid to a solution. This is because the salt is.
- A. Hydrated
 - B. Deliquescent
 - C. Efflorescent
 - D. Hygroscopic
3. Which one of the following metals reacts with cold water to produce hydrogen?
- A. Iron
 - B. Aluminium
 - C. Calcium
 - D. Zinc
4. An atom of an element has the structure $^{20}_{10}\text{X}$. The element
- A. forms covalent bonds readily with non metals
 - B. forms ionic bonds with non-metallic elements
 - C. belongs to group II of the Periodic Table
 - D. has full outermost shells of electrons in its atoms.
5. What is NOT true about the atoms $^{37}_{17}\text{P}$ and $^{35}_{17}\text{F}$?
- A. They have the same number of neutrons
 - B. They have the same number of protons
 - C. They have the number of electrons
 - D. They are atoms of the same element.

6. A compound has the following percentage composition by mass; carbon 40.0%, hydrogen 6.7% and Oxygen 53.3%. Given that the relative molecular mass of the compound is 180, what is the number of hydrogen atoms in one molecule of it? (H = 1, C = 12, O = 16)
- A. 6
B. 24
C. 12
D. 2
7. The same mass of magnesium carbonate was separately reacted with excess of different dilute acids. Which one of the following acids produced the last volume of Carbondioxide?
- A. Sulphuric acid
B. Ethanoic acid
C. Hydrochloric acid
D. Nitric acid
8. The form of carbon that is used in a dynamo as a lubricant is
- A. Diamond
B. Lamp black
C. Graphite
D. Wood charcoal
9. Which one of the following has a giant covalent structure?
- A. Diamond
B. Sodium chloride
C. Lead (II) bromide
D. Hydrogen chloride
10. Which one of the following gases is used as a fuel?
- A. Carbon dioxide
B. Methane
C. Oxygen
D. Nitrogen

11. When a mixture of carbon and substance Z was heated, there was no observable change. Z was

A. Al_2O_3

B. PbO

C. Fe_2O_3

D. CuO

☐

12. The atomic number of an element Q is 12. The atomic number of element R which is immediately below Q in the same group in the Periodic Table is

A. 14

B. 11

C. 13

D. 20

☐

13. When a solution containing magnesium ions was added to solution Z, a white precipitate was formed. Solution Z contained.

A. NO_3^-

B. CO_3^{2-}

C. SO_4^{2-}

D. HCO_3^-

☐

14. A solution P, gives a pink colour with phenolphthalein indicator. Which one of the following solutions can change the colour of the resulting solution from pink to colourless?

A. Dilute hydrochloric acid

B. Potassium hydroxide solution

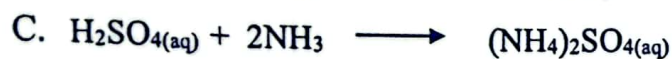
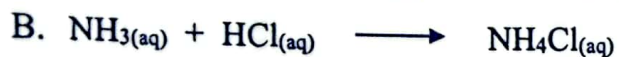
C. Aqueous ammonia

D. Sodium carbonate solution

☐

15. The heat change for a reaction is shown below:

$\text{NaOH(aq)} + \text{HCl(aq)} \longrightarrow \text{NaCl(aq)} + \text{H}_2\text{O(l)}$, $\Delta H = -57.3 \text{ kJ mol}^{-1}$ Which one of the following equations is of a reaction that will produce heat of the same magnitude?


☐

16. Which one of the following hydrocarbons has the highest carbon content?

(H = 1, C = 12)


☐

17. 11.6g of an oxide of iron was strongly heated with hydrogen gas to form

8.4g of metallic iron. The simplest formula of the oxide is (O = 16, Fe = 56)


☐

18. The products formed when ammonia is oxidized by air in the absence of a catalyst are.

A. nitrogen and hydrogen

B. nitrogen and water

C. nitrogen monoxide and water

D. dinitrogen oxide and water

☐

19. 20cm³ of 0.1M hydrochloric acid reacted completely with 25cm³ of sodium carbonate solution. What was the concentration of the sodium carbonate solution in moles per litre?

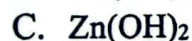
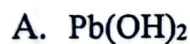
A. $\frac{20 \times 0.1}{25 \times 2}$

B. $\frac{20 \times 0.1 \times 1 \times 2}{25}$

C. $\frac{20 \times 0.1 \times 2}{1000 \times 25}$

D. $\frac{20 \times 0.1}{25}$

20. Which one of the following hydroxides is soluble in both excess sodium hydroxide solution and aqueous ammonia?



21. Which of the following can be used to distinguish between hydrogen chloride and chlorine?

A. Moist litmus paper

B. Calcium hydroxide solution

C. Burning splint

D. Aqueous potassium dichromate

22. In which one of the following reactions does sulphuric acid react as an oxidizing agent?

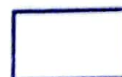


23. A carbonate of metal X was strongly heated in air and it decomposed according to the following equation. $\text{XCO}_{3(s)} \longrightarrow \text{XO}_{(s)} + \text{CO}_{2(g)}$?

What volume of the gaseous product was obtained at s.t.p when 2g of XO was formed?

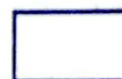
(O = 16, Cu = 64, 1 mole of gas occupies 22.4dm^3 at s.t.p)

- A. $\frac{2 \times 80}{44} \text{dm}^3$
- B. $\frac{2 \times 22.4}{80} \text{dm}^3$
- C. $\frac{80 \times 22.4}{2} \text{dm}^3$
- D. $\frac{44 \times 22.4}{80} \text{dm}^3$



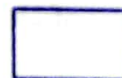
24. Dilute sulphuric acid was electrolyzed using platinum electrodes. Which one of the following statements is not true? The

- A. pH of the solution around the cathode rose
- B. pH of the solution around the anode lowered.
- C. Gaseous product at the anode gave a pop sound on ignition
- D. Volume of gaseous product at the cathode was twice that at the anode.



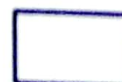
25. Which pair of ions in aqueous solutions can be distinguished using lead (II) nitrate solution?

- A. SO_4^{2-} and CO_3^{2-}
- B. Cl^- and NH_4^+
- C. Zn^{2+} and Al^{3+}
- D. Cl^- and CO_3^{2-}



26. A little of each of the following substances was dissolved in water and the pH of the resulting solutions determined. The solution with the lowest pH was that containing.

- A. CH_3COOH
- B. HCl
- C. NaCl
- D. NaOH



27. Z, a polymer formed by addition polymerization of 200 monomers has a molecular mass of 5600g and empirical formula CH_2 . What is the molecular formula of the monomer of Z?

- A. CH_2
- B. C_2H_4
- C. C_2H_6
- D. C_4H_8

28. Which one of the following substances will undergo a reversible reaction when heated?

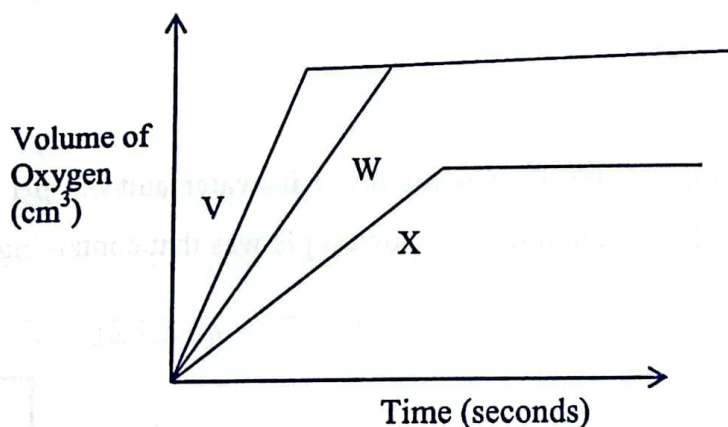
- A. $(\text{NH}_4)_2\text{SO}_4$
- B. $(\text{NH}_4)_2\text{CO}_3$
- C. NH_4NO_3
- D. NH_4Cl

29. 5.3kJ of heat was used to vaporize 13g of liquid of relative molecular mass

78. The heat of vaporization of the liquid is

- A. 78kJmol^{-1}
- B. 68.9kJmol^{-1}
- C. 31.8kJmol^{-1}
- D. 63.6kJmol^{-1}

30. The graph in the figure shows the variation of the volume of oxygen liberated when 100cm^3 of 2M hydrogen peroxide decomposed at 25°C .



To obtain curve V for the same reaction, all other conditions were kept constant except

- A. 100cm^3 of 1M hydrogen peroxide was used.
- B. the temperature was reduced to 12.5°C
- C. manganese (iv) oxide was added to the peroxide
- D. 200cm^3 of 2M hydrogen peroxide was used

☐

31. Which one of the following elements is extracted commercially by electrolysis of molten form of one of its compounds?

- A. Sodium
- B. Copper
- C. Iron
- D. Gold

☐

32. Which one of the following nitrates will give off reddish brown fumes when heated?

- A. NH_4NO_3
- B. NaNO_3
- C. KNO_3
- D. $\text{Ca}(\text{NO}_3)_2$

☐

33. Concentrated sulphuric acid reacted with a compound R to give off a gas that formed dense white fumes with ammonia gas. R could have been

- A. KNO_3
- B. KCl
- C. Na_2SO_3
- D. $\text{C}_2\text{H}_5\text{OH}$

☐

34. Which one of the following hydrocarbons decolourises bromine water?

- A. CH_4
- B. C_2H_6
- C. C_2H_4
- D. C_3H_8

☐

35. An element is found in period three and group IV of the Periodic Table. The number of protons in the nucleus of the atom of the element is

- A. 7
- B. 13
- C. 14
- D. 18

36. When sulphur dioxide gas was passed through a solution of concentrated nitric acid, reddish brown fumes and a solution that formed a white precipitate with acidified barium chloride was formed. It is true to say that.

- A. sulphur dioxide oxidised nitric acid to nitrogen dioxide
- B. nitric acid was reduced to nitrogen dioxide
- C. the resulting solution contained sulphate ions
- D. a neutralisation reaction took place.

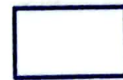
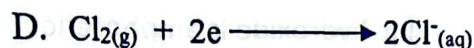
37. The final product formed when ethene is treated with excess hydrogen in the presence of nickel is

- A. C_2H_2
- B. C_2H_4
- C. C_2H_6
- D. CH_4

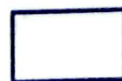
38. Which one of the following methods can be used to extract magnesium from its ore?

- A. Decomposition by heat
- B. Reduction with carbon monoxide
- C. Electrolysis
- D. Froth floatation

39. Which one of the following equations does NOT represent a reduction reaction?



40. Which one of the following reactions cannot take place as represented by the equation.



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.

Section:

- 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 not a correct statement.
- D. If the assertion is not correct but the reason is a correct statement.

INSTRUCTIONS SUMMARIZED

Assertion	Reason
A. True	True and is a correct explanation
A. True	True but is not a correct explanation
B. True	Incorrect
C. Incorrect	Correct

41. Chlorine gas turns the colour of iron(II) sulphate from green to brown because iron(II) ions in the solution are oxidised to iron(III) ions. ☐
42. Zinc hydroxide dissolves in excess aqueous ammonia because zinc hydroxide is amphoteric. ☐
43. A magnesium ion contains more electrons than a sodium ion because magnesium has a higher atomic number than sodium. ☐
44. Concentrated sulphuric acid is used in the preparation of hydrogen chloride because sulphuric acid is a strong oxidizing agent. ☐
45. Ammonia gas can be dried using concentrated sulphuric acid because ammonia is an alkaline gas. ☐

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 your answer according to the following.

- 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

INSTRUCTIONS SUMMARIZED

A	B	C	D
1, 2, 3 Only correct	1, 3 Only correct	2, 4 Only correct	4 Only correct

46. The oxide(s) which will dissolve in water to give a solution with a pH less than 7 is / are
1. SO_3
 2. CO_2
 3. NO_2
 4. Na_2O
-
47. When fuming nitric acid was heated, the gas(es) evolved was/were collected over water.
The gas(es) was/were.
1. nitrogen monoxide
 2. nitrogen dioxide
 3. hydrogen
 4. oxygen
-
48. Solution W was added to lead(II) nitrate solution and a white precipitate was formed. W could have contained.
1. Sodium sulphate
 2. ammonium nitrate
 3. Potassium carbonate
 4. Potassium iodide
-
49. Permanent hardness in water can be removed by
1. addition of sodium carbonate
 2. addition of calcium hydroxide
 3. distilling the water
 4. boiling the water
-
50. The gas(es) that will react will react with both hot copper(II) oxide and dilute sulphuric acid is/are
1. hydrogen
 2. carbon monoxide
 3. Sulphur dioxide
 4. ammonia
-