545/1
Chemistry
Paper 1
July -August 2023
1½ Hours

UGANDA MUSLIM TEACHERS' ASSOCIATION

UMTA JOINT MOCK EXAMINATIONS - 2023

NAME.....

INDEX NO.....SIGNATURE.....

UGANDA CERTIFICATE OF EDUCATION
Chemistry

Paper 1

1 hour 30 minutes

Instructions to Candidates:

- *This paper consists of 50 objective – type questions.*
- *Answer all questions.*
- *You are required to write the correct answer; **A**, **B**, **C** or **D** in the box provided on the right hand side of each question.*
- *Do not use pencil.*
- *(C=12; H=1, K=39; Cl=35.5; O=16; Mg=24; S=32; Fe=56; Ca= 40; Al=27; Zn=65; N=14; Cl=35.5)*
- *Molar gas volume at room temperature =24.0dm^3*
- *Molar gas volume s.t.p = 22.4dm.^{3}*
- *Density of water = 1g/cm^3*
- *Specific heat capacity of water = 4.2J/g/^{0}C*

FOR EXAMINER'S USE ONLY

1. Which one of the following metals will react most vigorously with both cold water and dilute sulphuric acid?

A. Copper
B. Sodium
C. Iron
D. Magnesium

2. Which one of the following substances can be separated by fractional crystallization?

A. Sodium sulphate and Sodium hydrogen Sulphate.
B. Sodium Chloride and Calcium Carbonate.
C. Aluminium Chloride and Lead(II) Chloride.
D. Pigments of Chlorophyll.

3. When carbon monoxide gas passed over heated 3.60g of a metal M, 6.00g of metal oxide was formed.

What is formula of the chloride of M

(M=24;O=16)

A. MCl_2
B. MCl
C. M_2CL_3
D. M_2Cl

4. Which one of the following conditions will sulphuric acid react with sulphur?

A. Hot and dilute
B. Cold and dilute
C. Hot and concentrated
D. Cold and concentrated

5. Which one of the following occurs when a zinc rod is dipped into a solution of copper(II) Sulphate?

A. The zinc rod increases in size
B. The colour of the solution remains blue
C. Copper(II)ions lose electrons to form a brown solid
D. The solution turns brown

6. Which one of the following substances when strongly heated changes from green to white and later red?

A. Iron(III) Sulphate
B. Iron(II) Sulphate
C. Iron(II) Sulphide
D. Copper (II)Sulphate

7. What is the mass of hydroxide ions present in $200cm^3$ of 0.1M Calcium hydroxide, $Ca(OH)_2$, solution?

(Ca=40; O=16; H=1)

A. 1.48g B. 0.68g C. 0.34g D. 68g

8. The major role of limestone in the extraction of iron is to.....

A. generate heat that facilitates the reduction of carbondioxide to carbon monoxide.
B. lower the temperature at which the Iron ore melts.
C. act as a reducing agent
D. remove impurities from the iron ore

9. When a dish containing sodium hydroxide pellets was left outside overnight, a white crust was observed at the bottom of the dish.

What ion is most likely to be present in the crust?

A. Sulphate
B. Hydrogen sulphate
C. Carbonate
D. Hydrogen Carbonate

10. Which one of the following substances is not affected by heat?

A. Aluminium chloride
B. Zinc Oxide
C. Copper(II)nitrate
D. Magnesium carbonate

11. Iron reacts with dilute hydrochloric acid according to the equation.

$$Fe_{(s)} + 2HCl_{(aq)} \longrightarrow FeCl_2\ (aq) + H_2(g)$$

If 10 g of impure iron was added to $50cm^3$ of 3M hydrochloric acid, what is the percentage purity of iron

(Fe=56; H=1; Cl =35.2)

A. 4.625 B. 4.2 C. 42 D. 84

12. To a solid **X** in a beaker, was added excess dilute nitric acid. Effervescence occurred and a colourless solution was formed .X is most likely to be .....

A. Zinc B. Calcium C. Copper D. Iron

13. An element Z has atomic number 20 and mass number 39. The ion of Z has;-

A. 20 protons B. 20 neutrons

C. 20 electrons D. 19 protons

14. When Zinc carbonate is heated, it decomposes according to the equation

$$ZnCO_3(s) \longrightarrow ZnO(s) + CO_2\ (s)$$

What mass of Zinc carbonate produces $0.648dm^3$ of carbondioxide at room temperature:

(Zn=65; C=12; O=16; 1Mole of a gas at room temperature =$24.0dm^3$)

A. $\frac{0.648 \times 125}{24}$

B. $\frac{0.648 \times 24}{125}$

C. $\frac{0.648}{24 \times 125}$

D. $\frac{125 \times 24}{0.648}$

15. Which one of the following is true about the electrolysis of concentrated Sodium chloride using graphite electrodes?

A. Greenish-yellow gas at the anode

B. Colourless gas at the anode

C. Anode reduces in size

D. Cathode increases in size

16. What volume of a 0.1M dibasic acid will completely neutralise $24.0cm^3$ of 0.15M Sodium hydroxide solution?

A . $36cm^3$ B. $18cm^3$ C.$8cm^3$ D. $72cm^3$

17. Elements X and Y are represented in the Periodic Table as;

$^{24}_{12}X$ and $^{35}_{17}Y$. Which one of the following statements is true about X and Y? They;-

A. combine to form a compound with a low melting point.

B. belong to the same period of the periodic table.

C. are both non – metallic

D. both conduct electricity

18. Which one of the following observations is true when concentrated nitric acid is added to the aqueous solution of the product formed when hydrogen chloride gas is passed over heated iron.

A. Green solution turns yellow

B. Yellow solution turns green

C. Green precipate turns brown

D. Yellow precipitate formed.

19. Which one of the following statements is correct?

A. All hydroxides decompose on heating to form oxides.

B. All oxides react with sodium hydroxide to form complexes.

C. All nitrates are soluble in water

D. All chlorides react with barium nitrate to form precipitate.

20. When 1.15g of ethanol was completely burnt in oxygen, the heat evolved raised the temperature of 50g of water by 30°C .Calculate the molar heat of combustion of ethanol. (let specific heat capacity of water =4.25J/g/K)

A. $\frac{50\times4.2\times30\times1.15}{46}$

B. $\frac{50\times4.2\times30}{46\times1.15}$

C . $\frac{50\times4.2\times30\times46}{1.15}$

D. $\frac{4.2\times30\times1.15}{46\times50}$

21. Which one of the following nitrates when strongly heated will produce one gas only?

A. Silver nitrate

B. Copper(II)nitrate

C. Sodium nitrate

D. Mercury(II)nitrate

22. When excess chlorine gas is bubbled through a solution of potassium hydroxide the following occurs; -

A. Colourless solution turns yellow

B. Green solution turns yellow

C. Solution remains colourless

D. white solid deposited.

23. Dry air was passed through sodium-hydroxide solution and then over heated copper metal. Which one of the following is a property of the residual gas?

A. It relights a glowing splint

B. It has a triple bond

C. Turns lime water milky

D. Turns anhydrous copper(II) sulphate blue

24. Which one of the following is the major aim of heating a mixture of sulphur and rubber?

A. To lengthen the rubber molecules

B. To improve on the chemical properties of rubber

C. To harden the sulphur molecules

D. To improve on the hardness, strength and durability of rubber

25. Which one of the following is the reason why sulphuric acid is used as a drying agent for many gases? It is.....

A. a dehydrating agent

B. hygroscopic

C.an oxidizing agent

D. a reducing agent

26. Which one of the following is the best method of minimizing air pollution?

A. Stop burning fossil fuels

B. Introducing limestone into the furnace of a power plant

C. Planting trees

D. Minimizing use of old vehicles.

27. Which one of the following equations represent an oxidation-reduction reaction?

A. $HCl_{aq} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O$ (i)

B. $Mg(s) + CuSO_4(aq) \rightarrow MgSO_4(aq) + Cu(s)$

C. $AgNO_{3(aq)} + NaCl_{(aq)} \rightarrow NaNO_{3\,(aq)} + AgCl_{(s)}$

D. $2Cu_{(s)} + O_{2(g)} \rightarrow 2CuO_{(s)}$

28. The percentage by mass of oxygen in hydrated sodium thiosulphate

$Na_2S_2O_3.5H_2O$, is.....

(Na=23; O=16; S=32; H=1)

A. $\frac{8\times1600}{248}$ B. $\frac{4\times1600}{248}$ C. $\frac{8\times1600}{158}$ D. $\frac{4\times1600}{158}$

29. Element N reacts with dilute hydrochloric acid while **T** does not. **L** displaces **T** from an aqueous solution of its salt. Which one of the following is the order of reactivity of elements beginning with the least reactive?

A. **N, T, L** B. **N, L, T** C. **T, L, N** D. **T, N, L**

30. Carbon monoxide burns in air to form carbondioxide, according to the equation:

$$2CO_{(g)} + O_{2\,(g)} \longrightarrow 2CO_{2(g)}$$

If 10 cm^3 of carbonmonoxide are mixed with 20 cm^3 of oxygen, what is the total volume of gas after the reaction?

A. 20 cm^3 B. 15 cm^3 C. 10 cm^3 D. 25 cm^3

31. Which one of the following substances can be used to precipitate impurities during the manufacture of sugar?

A. Animal Charcoal
C. Wood charcoal
B. Lime
D. Sulphur

32. Which one of the following statements is the reason why crushed zinc metal is used during the preparation of hydrogen gas in the laboratory?

A. There is increase in the number of reacting particles

B. The reacting particles gain kinetic energy

C. There is a decrease in the number of collisions among the reacting particles

D. There is increase in the number of reacting particles and number of collisions among reacting particles.

33. Ammonia reacts with heated copper(II) oxide as shown by the equation; -

$3CuO(s) + 2NH_{3(g)} \longrightarrow 3Cu_{(s)} + N_{2(g)} + 3H_2O\,(g)$

What volume of ammonia at s.t.p will react 2.4g of copper (II) oxide

(Cu=64; 1 mole of a gas at s.t.p occupies $22.4dm^3$)

A. $\frac{2.4 \times 3 \times 22.4}{2 \times 80}$
C. $\frac{3 \times 22.4}{2.4 \times 80}$
B. $\frac{2.4 \times 2 \times 22.4}{3 \times 80}$
D. $\frac{2.4 \times 22.4 \times 80}{3 \times 2}$

34. A black solid dissolved in dilute nitric acid to form a solution that reacts with ammonia solution and a deep blue solution was formed. Which of the following substance is the black solid?

A. Copper (II) Oxide
C. Tri-iron tetraoxide
B. Iron (II) Oxide
D. Iron (II) Sulphate.

35. Which one of the following statements is true about fats and oils?

A. They both react with sodium hydroxide in presence of heat to form soap

B. They are both solids at room temperature

C. Fats and oils are liquids at room temperature.

D. At higher temperatures, both fats and oils are solid.

36. Which one of the following substances will burn in chlorine to form dense white fumes?

A. Sodium C. Copper

B. Magnesium D. Phosphorus

37. Which one of the following processes decreases the concentration of carbondioxide in the atmosphere?

A. Formation of shells of snails

B. Respiration

C. Combustion of fuels

D. Hardening of mortar.

38. Which one of the following substances is deliquescent?

A. Zinc Chloride C. Sodium Carbonate

B. Aluminium Chloride D. Zinc Nitrate

39. Which one of the following substances has no effect on acidified potassium manganate(VII)?

A. Sulphur dioxide C. Hydrogen sulphide

B. Ethane D. Chlorine

40. A white solid dissolve in water to form a colourless solution and a gas that turns red litmus solution blue.

What is the Ph of the colourless solution?

A. 2 B. 4 C. 7 D.12

In each of the questions 41 to 45, one or more 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.

41. Which one of the following substances can form precipitates with acidified Lead(II)nitrate solution?

1.Sodium sulphate

2. Sodium Iodide

3. Aluminium chloride

4.Zinc carbonate

42. A wet coloured piece of paper turned white when inserted in a gas jar containing a substance X .The substance X could be.....

1. Chlorine
2. Sulphurous acid
3. Sulphurdioxide
4. Hydrogen Chloride

43. Which one of the following is/are products formed when ammonia is completely burnt in oxygen in presence of platinum catalyst?

1. Nitrogen(II)oxide
2. Nitrogen(IV)oxide
3. Water
4. Nitrogen

44. Which one of the following statements is/are true about allotropes of an element ? They have;-

1. Similar chemical properties
2. Similar physical properties
3. Different physical properties
4. Different chemical properties

45. Which one of the following is/are the role(s) of sodium carbonate during water treatment?

1. Remove hardness in water
2. Sweeten the water
3. Adjust the pH of water
4. To kill germs.

Each of the questions 46 to 50 Consists of an ascertain (statement) On the left-hand side and a reason on the right-hand side.

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	Reaction
A) True	True and is a correct explanation
B) True	True but is not a correct explanation
C)True	Incorrect
D) Incorrect	Correct

46. Dilute nitric acid is not used in the laboratory preparation of hydrogen by reacting it with a metal **because** it is a strong oxidizing agent.

47. When blue crystals of copper (II)sulphate are dropped into a beaker filled water, a blue solution is formed after sometime **because** matter consists of particles that are in random motion.

48. When burning magnesium is inserted into a gas jar of carbondioxide, a black solid and a white solid are formed **because** magnesium oxide and carbon are formed.

49. Molten sodium chloride conducts electricity **because** it contains mobile ions.

50. 2M nitric acid and 2M carbonic acid contain the same number of hydrogen ions **because** they react with alkalis to form a salt and water only.

END