545/1
Chemistry
Paper 1
July -August 2022
1½ Hours

UGANDA MUSLIM TEACHERS' ASSOCIATION

UMTA JOINT MOCK EXAMINATIONS - 2022

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/Kg*

FOR EXAMINA'S USE ONLY

1) Which one of the following elements will not react with water under any conditions.

A) Calcium B) Magnesium

C) Copper D) Zinc

2) Which one of the following mixtures cannot be separated by fractional distillation?

A) Petrol and diesel C) Water and ethanol

B) Paraffin and water D) air

3) Which one of the following oxides will react with sodium hydroxide but not nitric acid?

A) Carbondioxide C) Copper (II) oxide

B) Zinc oxide D) Lead (II) oxide

4) What is the percentage of oxygen in hydrated iron (II) sulpate $FeSO_4 \cdot 7H_2O$

A) $\frac{8 \times 1600}{278}$ B) $\frac{7 \times 1600}{278}$ C) $\frac{11 \times 1600}{278}$ D) $\frac{5 \times 1600}{278}$

5) Which one of the following salts can form a white precipitate with acidified silver nitrate?

A) Magnesium carbonate C) Magnesium sulpate

B) Sodium chloride D) Magnesium nitrate

6) Which one of the following occurs when carbon monoxide is passed over heated Lead (II) oxide?

A) Reddish- brown solid formed turns yellow on cooling.

B) Reddish – brown solid formed turns grey on cooling.

C) Yellow solid turns yellow on cooling.

D) Reddish – brown solid turns white on cooling

7) Aluminium reacts with iron (III) oxide according to the equation:

$Fe_2O_3(s) + 2Al(s) \longrightarrow Al_2O_3(s) + 2Fe(s)$

What mass of iron (III) oxide is reacted to produce 4.7g of Aluminium oxide?

A) $\frac{4.7 \times 160}{94}$ B) $\frac{94 \times 4.7}{160}$ C) $\frac{94 \times 160}{4.7}$ D) $\frac{160 \times 4.7}{94}$

8) The atomic number of an element X is 20. Which one of the following is true about the oxide of X? It dissolves in water to ——

A) Form a solution that turns blue litmus red.

B) Form a solution that turns red litmus blue.

C) Liberate hydrogen gas.

D) Form a neutral solution.

9) Which one of the following substances is produced at the cathode when concentrated sodium chloride is electrolysed using carbon electrodes?

A) Oxygen B) Sodium C) hydrogen D) Chlorine

10) Which one of the following substances when exposed to the atmosphere for a few days will turn into a liquid?

A) Sodium carbonate C) Zinc sulphate

B) Calcium carbonate D) Zinc chloride

11) The reaction between concentrated sulphuric acid and sucrose is ——

A) Oxidation C) Reduction

B) Dehydration D) Hydration

12) Which one of the following substances will undergo a chemical change when strongly heated?

A) Potassium carbonate B) Iodine

C) Iron (III) Chloride D) Copper (II) Carbonate

13) 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 a catalyst.

14) Which one of the following is not a property of propene?

A) It contains at least one double bond.

B) It produces carbondioxide and water when burnt in air.

C) It contains only single bonds.

D) It decolourises bromine water.

15) $24cm^3$ of 0.2 M sodium hydroxide reacts completely with $25cm^3$ of a dibasic acid of molecular mass 102g. what is the concentration of the acid in grams per litre?

A) $\frac{24 \times 0.2 \times 2 \times 102}{25}$

B) $\frac{24 \times 0.2 \times 102}{2 \times 25}$

C) $\frac{24 \times 0.2 \times 102}{25}$

D) $\frac{25 \times 0.2 \times 102}{2 \times 24}$

16) When $20cm^3$ of 2M sodium hydroxide was mixed with $20cm^3$ of 2M hydro-chloric acid and the mixture well stirred, the temperature of the solution rose to 13^0C. what is the molar heat of neutrallisation of the acid?

A) $\frac{40 \times 4.2 \times 13 \times 1000}{40}$

B) $\frac{20 \times 4.2 \times 13 \times 1000}{40}$

C) $\frac{40 \times 4.2 \times 13 \times 40}{1000}$

D) $\frac{40 \times 4.2 \times 13 \times 1000}{20}$

17) Which one of the following reactions proceeds very slowly under ordinary conditions?

A) Magnesium and sulphuric acid.

B) Zinc carbonate and nitric acid.

C) Phosphorous and oxygen.

D) Iron and water.

18) Which one of the following can be used to detect the gas produced when a mixture of sulphur and concentrated sulphuric acid is heated?

A) Bromine water

B) Glowing splint

C) Ammonia Solution

D) Potassium dichromate

19) Which one of the following elements is a component of the substance that dissolves in water forming a solution that turns red litmus blue and a gas that relights a glowing splint?

A) Magnesium

B) Sulphur

C) Sodium

D) Calcium

20) Which one of the following is not an alkali?

A) Magnesium hydroxide
B) Zinc hydroxide
C) Sodium hydroxide
D) Calcium hydroxide

21) Zinc carbonate reacts with dilute nitric acid according to the equation;

$$Z_nCO_{3\,(S)} + 2HNO_{3\,(aq)} \longrightarrow Z_n(NO_3)_{2\,(aq)} + CO_{2\,(g)} + H_2O_{(l)}$$

What mass of zinc nitrate is formed when $25cm^3$ of 0.2M nitric acid reacted completely with the carbonate?

A) $\frac{25 \times 0.2 \times 189}{1000}$
B) $\frac{25 \times 189}{2 \times 0.2 \times 1000}$
C) $\frac{25 \times 0.2 \times 189}{2 \times 1000}$
D) $\frac{2 \times 25 \times 0.2 \times 189}{1000}$

22) When hydrogen gas was passed over 16.2g of an oxide of a metal M, 13.0g of metal M was formed. What is the formula of the sulphate of M?

(M = 65, O = 16)

A) $M_3(SO_4)$ B) $M_2(SO_4)_3$ C) MSO_4 D) M_2SO_4

23) Hydrogen gas burns in oxygen to form water according to the equation;

$$2H_{2(g)} + O_{2(g)} \longrightarrow 2H_2O_{(l)}$$

What volume of gas remains unreacted if $20cm^3$ of hydrogen and $60cm^3$ of oxygen are allowed to react?

A) $80cm^3$ B) $40cm^3$ C) $30cm^3$ D) $50\ cm^3$

24) After boiling some water, a lot of soap is required to form lather. Which one of the following substances may be present in the water?

A) Magnesium hydrogen carbonate
B) Calcium carbonate
C) Sodium carbonate
D) Calcium sulphate

25) Which one of the following is not a role of soda ash during water treatment?

A) Removal of sediments or suspended particles in water.
B) Removal of hardness in water

C) Adjusting the PH of the water

D) Softening water

26) Which one of these statements is the reason why calcium oxide is used to dry ammonia gas? It is ———

A) Basic and dehydrating agent

B) Basic and hygroscopic

C) Both basic and reactive

D) Basic and soluble in water

27) Which one of the following is observed when hydrogen chloride gas is passed over heated iron fillings?

A) A green solid

B) A white solid

C) A reddish- brown solid.

D) A grey solid

28) The following gases are major atmospheric pollutants except ———

A) Carbonmonoxide

B) Sulphurdioxide

C) carbondioxide

D) Nitrogendioxide

29) Atoms of elements **X** and **Y** are represented as $^{24}_{12}X$ and $^{40}_{20}Y$ in the periodic table. Which one of the following statements is true about elements **X** and **Y**?

A) They have the same number of electrons in the outer most energy levels.

B) They have the same number of neutrons in the nucleus.

C) They have the same physical properties

D) They have the same atomic mass

30) The mass of $96cm^3$ of a gaseous hydro- carbon **Z** at room temperature is 0.224g. What is the molecular formular of the hydrocarbon if it contains 85.7% carbon?

A) C_4H_8 B) C_4H_{10} C) C_3H_6 D) C_4H_6

31) Which one of the following substances can be used as a bleaching agent in the textile industry?

A) Chlorine

B) Sulphurous acid

C) Sulphurdioxide

D) Hydrogen chloride

32) Which one of the following is produced when ammonia is reacted with oxygen in the presence of platinum catalyst?

A) Nitrogen

B) Nitrogen (I) oxide

D) Nitrogen (IV) oxide

C) Nitrogen (II) oxide

33) Ethanol burns in oxygen according to the equation;

$$C_2H_5OH_{(l)} + 3O_{2(g)} \longrightarrow 2CO_{2(g)} + 3H_2O_{(l)}$$

$$\Delta H = -1370.0\ KJmol^{-1}$$

If 0.115g of ethanol is required to raise the temperature of xg of water by 22.5^0C. what is the value of x?

A) $\frac{46 \times 1370 \times 10^3}{0.115 \times 4.2 \times 22.5}$

B) $\frac{0.115 \times 4.2 \times 22.5}{1370 \times 10^3}$

C) $\frac{0.115 \times 46 \times 4.2}{1370 \times 10^3 \times 4.2}$

D) $\frac{0.115 \times 1370 \times 10^3}{46 \times 4.2 \times 22.5}$

34) Which one of the substances contains the same number of moles as $400cm^3$ of ammonia at room temperature?

A) 0.11g of chlorine

B) 7.0g of carbondioxide

C) 0.5g of nitrogen (II) oxide

D) 0.5g of nitrogen (I) oxide

35) Which of the following nitrates when heated will give only gaseous products?

A) Silver nitrate

B) Copper (II) nitrate

C) Potassium nitrate

D) Zinc nitrate

36) Which one of the following is the mass of hydroxide ions in $200cm^3$ of 0.5M calcium hydroxide?

A) 1.7g B) 3.4g C) 1700g D) 85.0g

37) Which one of the following substances dissolve in water to form a solution whose PH is less than seven?

A) Ethanol

B) Ammonium sulphate

C) Sodium sulphate

D) Potassium chloride

38) Which one of the following gases diffuses fastest when each gas is placed in a gas of the same size?

A) Chlorine
B) Ammonia
C) H..gen chloride
D) Carbondioxide

39) Metals **M, N,** and **T** have the following properties;

i) **M** displaces **T** from solutions of its ions
ii) **T** reacts with dilute hydrochloric acid to liberate hydrogen gas.
iii) **N** does not react with acids under any conditions.

The order of reactivity of the metals beginning with the least reactive is ____

A) M, T, N
B) N,T,M
B) M,N,T
D) N,M,T

40) Which of the following is the best explanation for increasing the concentration of reactants in a chemical reaction?

A) Increase the kinetic energy of the reactant particles.
B) Increase the chance of collision of the reactant particles.
C) Increase the amount of reactants
D) Increase the area of contact between the reactant particles

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

Select;

A) If both the assertion and reason are true statements and reason is a correct explanation of the assertion.
B) If both the assertion and 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 correct but the reason is a correct statement.

Instructions summarised

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

41) When chlorine gas is passed through potassium iodide solution, a black solid is deposited.

Because chlorine is a very strong reducing agent

42) Both graphite and diamond are allotropes.

Because they have the same physical and chemical properties.

43) Molten calcium chloride is used during the extraction of sodium

Because calcium chloride lowers the melting point of molten sodium chloride

44) Magnesium burns in nitrogen to form a white solid.

Because Nitrogen has a triple bond

45) When dilute sulphuric acid is added on to calcium powder, in a beaker, very little effervescence occurs

Because the coating formed on the metal provides a large surface area of contact with the acid.

In each of the questions 46 to 50 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.

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 compounds when reacted with both sodium hydroxide and ammonia solutions will form precipitates that are insoluble in excess alkali

1. Magnesium sulphate
2. Calcium chloride
3. Iron (II) Sulphate
4. Zinc sulphate

47) Which of the following is / are the products formed when ammonium nitrate is heated?

1) Dinitrogen oxide
2) Nitrogen monoxide
3) water
4) Nitrogendioxide

48) Which one of the following is / are the reason(s) why using steel is preffered to iron?

1) It is resistant to rusting
2) More attractive
3) More durable
4) Good conductor of electricity

49) Which one of the following salts is / are prepared by precipitation?

1) Silver chloride
2) Calcium chloride
3) Calcium sulphate
4) Barium chloride

50) Reduction is a reaction in which;

1) Electrons are added to a substance
2) Oxygen is removed from a substance
3) Hydrogen is added to a substance
4) Hydrogen is removed from a substance

END