545/1
CHEMISTRY
Paper 1
July / Aug. 2019
1 ½ hours

JOINT MOCK EXAMINATIONS 2019

Uganda Certificate of Education

CHEMISTRY

Paper 1

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of 50 objective questions

Attempt **all** questions

You are required to write the correct answer A, B, C or D against each question in the box on the right hand side of each page

Molar gas volume at s.t.p is 22.4 dm^3

Do not use pencil

1. The atomic number of element **X** is 13, the electronic configuration of the ion of **R** is;

A. 2:8
B. 2:8:5
C. 2:8:3
D. 2:8:8

2. The elements that can be extracted from their oxide by chemical reduction using carbon are;

A. Ca and Cu
B. Mg and Cu
C. Zn and Fe
D. Al and Zn

3. Which one of the following is produced at the cathode when a solution of copper (II) sulphate is electrolysed using carbon electrodes?

A. Oxygen
B. Hydrogen
C. Copper
D. Sulphur dioxide

4. Which one of the following salts can be separated by filtration?

A. Sodium carbonate and ammonium carbonate
B. Ammonium sulphate and magnesium sulphate
C. Barium chloride and barium nitrate
D. Zinc carbonate and zinc sulphate

5. Which one of the following hydrocarbons decolourise bromine water when bubbled through it?

A. Methane
B. Propene
C. Butane
D. Ethane

6. What mass of sodium hydroxide would be needed to neutralize exactly 200cm^3 of a solution containing 49g of sulphuric acid per litre?

$2NaOH(aq) + H_2SO_4(aq) \longrightarrow Na_2SO_4(aq) + 2H_2O(l)$

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

A. 4g
B. 8g
C. 16g
D. 32g

7. A solid **M** dissolves in water to form a colourless gas that fumes with hydrogen chloride gas. The solid **M** is likely to be;

A. Magnesium nitrate
B. Magnesium nitride
C. Sodium nitrate
D. Sodium peroxide

8. $20cm^3$ of 0.1M sodium carbonate solution reacted completely with $10cm^3$ of dilute hydrochloric acid according to the equation below;

$Na_2CO_3(aq) + 2HCl(aq) \longrightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

The molarity of the acid is?

A. $\frac{2\ x\ 20\ x\ 0.1}{10}\ M$
B. $\frac{10\ x\ 0.1}{20\ x\ 2}\ M$
C. $\frac{20\ x\ 0.1}{10\ x}\ M$
D. $\frac{20\ x\ 10}{0.1\ x\ 2}\ M$

9. Which one of the following conducts electricity in a solution of sodium chloride?

A. Electrons
B. Neutrons
C. Protons
D. Ions

10. In which of the following reactions is chlorine acting as an acidic gas?

A. $2Fe(s) + 3Cl_2(g) \longrightarrow 2FeCl_3(s)$
B. $2Na(s) + Cl_2(g) \longrightarrow 2NaCl(s)$
C. $H_2(g) + Cl_2(g) \longrightarrow HCl(g)$
D. $NaOH(aq) + Cl_2(g) \longrightarrow NaOCl(aq) + NaCl(aq) + H_2O(l)$

11. Silver nitrate solution was added to solution **F** and a white precipitate was formed. The precipitate dissolved in aqueous ammonia. Solution **F** contained;

A. Carbonate ions
B. Sulphate ions
C. Chloride ions
D. Nitrate ions

12. Nitrogen reacts with hydrogen according to the equation;

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

The volume of gaseous products formed when $50cm^3$ of nitrogen were mixed with $120cm^3$ of hydrogen is;

A. $70cm^3$
B. $80cm^3$
C. $90cm^3$
D. $170cm^3$

13. Which of the following mixtures does **not** contain copper?

A. Brass
B. Bronze
C. Solder
D. Duralumin

14. Element **W** forms ion **W-** whose electronic configuration is 2:8:8. The number of protons in the nucleus of the atom is;

A. 17
B. 18
C. 19
D. 39

15. 1.0g of sodium hydroxide was dissolve in water to make 250cm^3 of solution;

The molarity of the solution is;

A. 0.05M
B. 0.1M
C. 0.5M
D. 2M

16. An element burns readily in oxygen to form a solid. The solid dissolves in water producing an alkaline solution and a gas that relights a glowing splint. The element is most likely to be;

A. Phosphorous
B. Sulphur
C. Sodium
D. Phosphorous

17. Charcoal burns in oxygen according to the equation

$C(s) + O_2(g) \longrightarrow CO_2(g)$ DH = -390 KJ mol^{-1}

The heat energy change produced when 48g of charcoal burns in excess oxygen is;

A. -97.5 KJ
B. -195 JK
C. -780 KJ
D. -1560KJ

18. Which one of the following is a waste product of the solvay process for the manufacture of sodium carbonate?

A. NH_3
B. CaO
C. $CaCl_2$
D. $NaHCO_3$

19. What mass in grams of sodium carbonate dehydrate; $Na_2CO_3.10\ H_2O$ is contained in 50cm^3 of a 0.1M solution?

A. $\frac{106\ x\ 0.1\ x\ 1000}{50}$

B. $\frac{106\ x\ 0.1\ x\ 50}{1000}$

C. $\frac{286\ x\ 0.1\ x\ 1000}{50}$

D. $\frac{286\ x\ 0.1\ x\ 50}{1000}$

20. Lead (II) nitrate solution reacts with hydrogen chloride gas according to the equation $Pb(NO_3)_2\ (aq) + 2HCl(g) \longrightarrow PbCl_2(s) + 2\ HNO_3(l)$

Calculate the mass of the precipitate formed when 1.2 dm^3 of hydrogen chloride gas is bubbled through excess aqueous solution of lead (II) nitrate (Pb = 207, Cl = 35.5, 1 mole of a gas occupies 24 dm^3 at room temperature)

A. 0.207dm^3

B. 6.95 dm^3

C. 2.07 dm^3

D. 0.695 dm^3

21. During the electrolysis of copper II sulphate solution using copper electrodes which one of the following is observed?

A. The cathode reduces in size

B. The anode increases in size

C. The anode becomes polarized

D. The anode decreases in size

22. Which one of the following salts can be prepared by neutralization method?

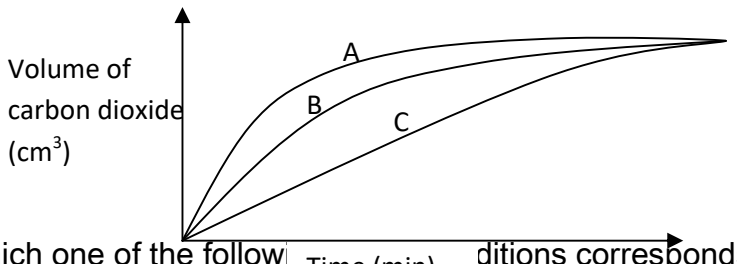
A. Lead (II) sulphate

B. Lead (II) chloride

C. Copper (II) sulphate

D. Copper (II) carbonate

23. Experiments on the rate of reaction between marble chips and hydrochloric acid were carried out using various conditions and the curves for the volume of carbon dioxide against time were plotted on the same axes as below;



Which one of the follow ditions corresponds to curve A?

A. 2M hydrochloric acid and marble chips lumps

B. 2M hydrochloric acid and powdered marble chips

C. 1M hydrochloric acid and marble chips lumps

D. 1M hydrochloric acid and marble chips powder.

24. Which one of the following is observed when carbon dioxide gas is bubbled through sodium hydroxide solution until excess?

A. White precipitate

B. White precipitate soluble in excess

C. Colourless solution

D. Yellow precipitate

25. When lead (II) nitrate solution was added to a colourless solution containing an anion **X** , a white precipitate soluble on warming was observed. The confirmatory test for the anion is addition of;

A. Dilute nitric acid followed by barium nitrate solution

B. Dilute nitric acid followed by lead (II) nitrate solution.

C. Dilute nitric acid followed by silver nitrate solution

D. Addition of dilute nitric acid

26. Which one of the following is observed when sodium nitrate is heated?

A. Yellow solid and brown gas

B. Reddish brown solid and courless gas that relights a glowing splint.

C. Reddish brown solid and brown gas

D. Yellow solid and colourless gas that relights a glowing splint.

27. Which one of the following substances can be used to dry ammonia gas?

A. Anhydrous calcium chloride

B. Concentrated sulphuric acid

C. Calcium oxide

D. Silica gel

28. Burning magnesium ribbon was dipped into a gas jar containing nitrogen gas and the product formed was dissolved in water. Which one of the following is true about the solution formed?

A. It turns blue litmus paper to red
B. It turns red litmus paper to blue
C. It liberate s hydrogen gas with magnesium ribbon
D. It liberates carbon dioxide with carbonates

29. Which one of the following is the impurity in spathic iron ore?

A. Gold
B. Silver
C. Silicon dioxide
D. Mercy

30. Which one of the following metals will displace lead from its sulphate on heating?

A. Copper
B. Mercury
C. Magnesium
D. Gold

31. The following are pairs of unsaturated hydrocarbons, **except;**

A. C_2H_2 and C_2H_6
B. C_2H_4 and C_3H_6
C. C_2H_2 and C_2H_4
D. C_3H_4 and C_4H_8

32. The catalyst used in the oxidation of sulphur dioxide to sulphur trioxide during the manufacture of sulphuric acid is;

A. Iron (III) oxide
B. Silicon (IV) oxide
C. Vanadium (V) oxide
D. Manganese (IV) oxide

33. The change from Cu to Cu^{2+} involves;

A. Loss of electrons
B. Loss of protons
C. Gain of elections
D. Gain of protons

34. Which of the following is the best explanation for increasing surface area of the reactants in the chemical reaction?

A. Decreases the kinetic energy
B. Increases the rate of collision of the particles
C. Increases the amount of reactants
D. Increase the area of contact between reactants.

35. Which one of the following are properties of metals?

A. Low melting point, solid doesn't conduct electricity and insoluble in water

B. High melting point, solid does not conduct electricity but aqueous solution conducts

C. High melting point, solid conducts electricity, insoluble in water.

D. Low melting point solid does not conduct electricity, aqueous solution doe not conduct electricity.

36. The separation of dyes in ink by chromatography depends on the;

A. Different boiling points of dyes in ink.

B. Freezing points of substances.

C. Solubility of the dyes in the solvent

D. Size of the chromatography paper

37. Which one of the following salts cannot be prepared by precipitation?

A. $BaSO_4$

B. AgCl

C. $PbCO_3$

D. $AgNO_3$

38. Diamond does not conduct electricity because;

A. Its structure is very compact

B. There are carbon atoms present

C. Has no free mobile electrons

D. It is crystalline in nature

39. A compound is composed of 40% carbon, 6.7% hydrogen, the rest being oxygen. 0.32 moles of a sample of the compound weighs 28.8g. Determine the molecular formula of the compound.

A. CH_2O

B. $C_2H_2O_2$

C. C_2H_4O

D. C_3H6O_3

40. Which one of the following is an example of a non biodegradable substance?

A. Wood
B. Wool
C. Silk
D. Polyethene

Each of the questions 41 to 45 consist of an assertion (statement) on the left hand side and a reason on the right hand side the answer is;

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

INSTRUCTION SUMMARY

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

41. Temporary hardness of water can be removed by boiling	Because	Temporary hardness is caused by the presence of hydrogen carbonate of magnesium in water.
42. Graphite conduct electricity	Because	Graphite has free and mobile electrons within its layers.
43. Concentrated sulphuric acid is used to dry most gases.	Because	Sulphuric acid is a weak acid

44. Molten sulphur is an allotrope of sulphur	**Because**	Molten sulphur forms a crystalline sulphur when poured into cold water
45. Ethanol burns in air producing water and carbon dioxide gas.	**Because**	Ethanol is an alkene

In each of the questions 46 to 50 one or more of the answer may be correct. Read each question carefully and indicate on your answer sheet according to the following: The answer is;

A. If 1, 2 and 3 are correct

B. If 1 and 3 only are correct

C. If 2, 4 only are correct

D. If 4 only is correct

46. During purification of water from a lake for domestic rise, aluminium sulphate is added to;

1. Bleach water
2. Kill virus and bacteria
3. To remove organic matter from water
4. Congulate fine suspended particles.

47. When an iron nail is exposed to air in the presence of moisture it rusts. Which one of the following methods will slow down the rate of rusting of the iron nail?

1. Washing with concentrated hydrochloric acid and keep it dry
2. Coating it with zinc
3. Sprinkling common salt solution on it
4. Painting

48. Which of the following compound(s) is / are saturated hydrocarbon(s)

1. $C_2 H_6$
2. $C_3 H_8$
3. $C_4 H_{10}$
4. $C_5 H_3$

49. Which of the following observations is made when ammonia solution is added to aqueous solution containing copper (II) ion a little at first then in excess?

1. White precipitate insoluble in excess
2. Pale blue precipitate is formed
3. Yellow precipitate
4. Pale blue precipitate dissolves to form a deep blue solution

50. Which of the following is / are observed when copper (II) nitrate is strongly heated?

1. Green solid forms black residue
2. Colourless condensate at the cooler part of the test tube
3. Brown fumes
4. Grey residue remains.

End