NAME.....

INDEX NUMBER...../..... SIGINATURE.....

545/1

CHEMISTRY

July/August 2022

1hour 30 minutes

KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY

Paper 1

1hour 30 minutes

Instructions to candidates

- *Answer any **All** questions.*
- *You are required to write the correct answer **A**,**B**,**C**,**D** in the box on the right hand side.*
- *Molar gas sat* s.t.p =22.4dm^3
  Molar gas volume at room temperature =*24*dm^3

(Cu=63.5,Mg=24,C=12,H=1,O=16,S=32,Fe=56,Cl=35.5,Na=23,N=14)

1. Which of the following oxides, when heated will react with carbon to form a brown solid?
   A. CuO
   B. ZnO
   C. PbO
   D. FeO

2. Borehole water decomposes on boiling to produce a white coating in saucepans. The white coating is due to?
   A. Calcium hydrogen carbonate
   B. Calcium carbonate
   C. Calcium hydrogen sulphate
   D. Calcium sulphate

3. Which of the following metals can react with steam?
   A. Copper
   B. Lead
   C. Silver
   D. Iron

4. Which of the following acids when reacted with a given mass of copper(II) carbonate will liberate the least amount of carbon dioxide?
   A. 1M sulphuric acid
   B. 2M nitric acid
   C. 2M ethanoic acid
   D. 2M hydrochloric acid

5. Propane burns in air according to the following equation.

   $C_3H_{8\,(g)} + 5O_{2\,(g)} \longrightarrow 3CO_{2\,(g)} + 4H_2O_{(g)}$.

   Which of the following is the volume of air required for complete combustion of 60cm^3 of propane? (the percentage of oxygen in air is 21% by volume)

   A. $(\frac{21X5X60}{100})$ cm^3
   B. $(\frac{5X100}{60X21})$ cm^3
   C. $(\frac{5X60X100}{21})$ cm^3
   D. $(\frac{100X60}{21X5})$ cm^3

6. When concentrated sulphuric acid was added to white sugar. A black solid was formed. This is because sulphuric acid;
   A. Burnt the sugar
   B. Oxidizes the sugar
   C. Reduces the sugar
   D. Dehydrates the sugar.

7. Which one of the following substances are components of chlorine water?
   A. Chlorine and water
   B. Hydrochloric acid and chlorine
   C. Hydrochloric acid and hypochlorous acid
   D. Hypochlorous acid and water

8. Which of the following oxides does not react with water?
   A. Sulphur dioxide
   B. Calcium oxide
   C. Zinc oxide
   D. Nitrogen dioxide

9. Calcium carbonate decomposes on heating according to the equation below.

   $CaCO_{3\,(S)} \longrightarrow CaO_{(g)} + CO_{2\,(g)}$

   The maximum volume of carbon dioxide produced at s.t.p when 10.0g of calcium carbonate is heated is?

   [*$CaCO_3$ =100, 1 mole of a gas occupies 22.4dm^3 at s.t.p*]

   A. $(\frac{10X22.4}{100})$ dm^3
   B. $(\frac{10X100}{22.4})$ dm^3
   C. $(\frac{22.4}{10X100})$ dm^3
   D. $(\frac{100}{10X22.4})$ dm^3

10. Which one of the following substances is formed as a solid when a container of lime water is left open for a long time?

A. Calcium hydrogen carbonate
B. Calcium hydroxide
C. Calcium oxide
D. Calcium carbonate

11. Which one of the following pairs of cations when in solution can be distinguished using potassium iodide solution?

A. Pb^{2+} and Al^{3+}
B. Zn^{2+} and Al^{3+}
C. Zn^{2+} and Fe^{2+}
D. Fe^{2+} and Fe^{3+}

12. The number of moles of hydroxide ions contained in 10g of calcium hydroxide, $Ca(OH)_2$, is?

A. 0.135
B. 0.175
C. 0.270
D. 0.350

13. Which one of the following is **not** a property of hydrogen chloride gas?

A. It forms a white precipitate with silver nitrate
B. It turns moist blue litmus paper red.
C. It forms dense white fumes with ammonia gas.
D. It bleaches coloured flowers.

14. Which one of the following metals can be extracted from its ore by reduction method?

A. Zinc
B. Aluminium
C. Calcium
D. Sodium

15. Which one of the following pair of solution will show apparent loss in final mass when mixed?

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.

16. 25.0 cm^3 of a 2.0 M sodium hydroxide solution reacted with 16.6cm^3 of a 0.1 M solution of an acid. The ratio in which the acid reacted with sodium hydroxide is?

A. 1:2
B. 1:3
C. 2:1
D. 3:1

17. Which one of the following is the reason why sodium chloride is added to the hot solution of oil and alkali during saponification process?

A. To reduce the solubility of soap produced
B. To reduce the soap bubbles produced
C. To reduce the surface tension of water
D. To increase the solubility of soap

18. Which one of the following substance will melt on heating strongly?

A. Iodine
B. Ammonium chloride
C. Sodium sulphate
D. Iron(III) chloride

19. Element **X** belongs to group (IV) of the periodic table. The formula of the oxide of X is;

A. X_2O
B. XO_2
C. X_4O
D. XO_4

20. A gaseous hydrocarbon M was found to contain 85.7% carbon and the rest being hydrogen. The empirical formula of M is?

A. C_2H_4 C. CH_4

B. C_2H_6 D. CH_2

21. The gas produced when water is added to magnesium nitride (Mg_3N_2) is?

A. Nitrogen

B. Ammonia

C. Nitrogen dioxide

D. Nitrogen oxide.

22. When alcohols are heated to a temperature of 180^0C with excess concentrated sulphuric acid, they undergo dehydration. The ptoduct of the reaction is?

A. Alkane C. Alkene

B. Alkanol D. Alkyne

23. Sulphur dioxide reacts with oxygen according to the equation.

$2SO_{2\,(g)} + O_{2\,(g)} \rightleftharpoons 2SO_{3\,(g)}$ $\triangle H$ = negative. Which of the following conditions would give the best yield of Sulphur trioxide?

A. Low temperatures and low pressure

B. High temperatures and high pressure

C. Low temperatures and high pressure

D. High temperatures and low pressure

24. Hydrogen peroxide decomposes to produce oxygen. Identify the condition(s) under which the rate of production of oxygen would be fastest.

A. A 2M hydrogen peroxide at room temperature

B. A 2M hydrogen peroxide and MnO_2 heated at 30^0C

C. A 1M hydrogen peroxide heated at 35^0C

D. A 1M hydrogen peroxide and MnO_2 at room temperature.

25. Which one of the following alloys contains lead?

A. Solder C. Duralumin

B. Stainless steel D. Brass

26. The ion R^{2+} has 12 neutrons and 10 electrons. The atomic mass of R is?

A. 20 C. 22

B. 21 D. 24

27. $20cm^3$ of an acid ***HX*** was neutralized by $25cm^3$ of a 0.05M sodium carbonate. Which one of the following is the molarity of the acid?

A. $(\frac{25X0.05}{20})$M C. $(\frac{2X20X0.05}{25})$M

B. $(\frac{2X25X0.05}{20})$M D. $(\frac{25X0.05}{2X20})$M

28. The electronic configuration of an atom of an element **G** is **2:8:6**. The compound formed between **G** and hydrogen;
    A. Reacts with a damp Sulphur dioxide to form a yellow solid.
    B. Dissolves in water to form a neutral solution
    C. Dissolves in water to form an alkaline solution
    D. Is a solid with high melting point.

29. Which of the following pair of compounds whose formulae are given will decompose to give off a colourless gas when heated.
    A. KNO_3 and $CuCO_3$
    B. KNO_3 and $Cu(NO_3)_2$
    C. $Zn(NO_3)_2$ and KNO_3
    D. $Pb(NO_3)_2$ and $NaNO_3$

30. When 12.4g of copper(II) carbonate was heated strongly, the mass lost was? (Cu=64, C=12, O=16)
    A. 4.4g
    B. 2.2g
    C. 8.0g
    D. 6.0g

31. Which of the following pairs of salts can be prepared by direct synthesis?
    A. Iron(II) chloride and iron(III) chloride
    B. Iron(III) chloride and magnesium chloride
    C. Lead(II) chloride and iron(III) chloride
    D. Lead(II) sulphate and zinc sulphate

32. Which one of the following is an example of a non-biodegradable substance?
    A. Wood
    B. Silk
    C. Wool
    D. Polyethene.

33. Which one of the following is the product of the reaction between Sulphur and concentrated sulphuric acid?
    A. Sulphur dioxide
    B. Hydrogen sulphide
    C. Sulphuric acid
    D. Sulphur trioxide.

34. A solid when heated with dilute hydrochloric acid gives a gas which turns lime water milky. The solid;
    A. Contained a carbonate
    B. Was a zinc carbonate
    C. Contained carbon powder
    D. Was a mixture of carbon and a metal oxide?

35. Which one of the following catalysts is used during the manufacture of nitric acid from ammonia?
    A. Platinum
    B. Manganese(IV) oxide
    C. Vanadium(V) oxide
    D. Finely divided iron.

36. Which one of the following is observed when hydrogen is passed over heated copper(II) oxide?
    A. A grey solid
    B. A brown solid
    C. A black solid
    D. A yellow solid.

37. Which of the following substance is used to test for the presence of Sulphur dioxide?

A. $AgNO_3$ C. $BaCl_2$

B. $FeSO_4$ D. $K_2Cr_2O_7$

38. Which one of the following is formed when turpentine, $C_{10}H_{16}$ is burnt in chlorine?

A. Methane C. Hydrogen chloride

B. Hydrogen D. Carbon dioxide

39. Which of the following gases is used in the extraction of iron from its ore?

A. Chlorine C. Carbon monoxide

B. Nitrogen dioxide D. Sulphur trioxide.

40. A compound contains 53.3% oxygen, 6.7%hydrohen and 40% carbon. The simplest formula of the compound is?

(C=12, H=1, O=16)

A. CHO C. C_2H_2O

B. CH_2O D. CH_2O_2

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.

Select:

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

B. If both 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 an incorrect statement

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

Summary of instructions		
	Assertion	**Reason**
A	True	True (reason is a correct explanation)
B	True	True (reason is not a correct explanation
C	True	Incorrect
D	Incorect	True statement

41. When excess sodium hydroxide solution is added to a solution of copper(II) salt, a deep blue solution is formed **because** copper(II) hydroxide is an insoluble base

42. Ethene and ethane undergo Addition reaction with bromine **because** ethene and athane are hydrocarbons

43. when iron powder is added to a solution of copper(II) sulphate, a brown precipitate is formed. **because** iron(III) oxide which is brown is formed

44. Hydrogen chloride conducts electricity. **because** hydrogen chloride is soluble in water

45. The pH of an aqueous solution of ammonium sulphate is less than 7 **because** reacts with water to form an alkaline solution

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 on your answer sheet 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. Which of the following compounds will react with hydrogen sulphide to produce a yellow precipitate of Sulphur?
    1. Iron(II) chloride solution
    2. Concentrated sulphuric acid
    3. Sulphuric(IV) oxide
    4. Concentrated hydrochloric acid

47. Which one of the following is/ are uses of graphite?

1. Making drillers
2. Making electrodes
3. Making jewellery
4. Making lubricants

48. When the product formed from burning sodium in excess oxygen is dissolved in water.

1. Oxygen is produced
2. An explosion is heard
3. An alkaline solution is formed
4. Sodium carbonate solution is formed

49. Which of the following properties is/ are true about group I elements?

1. The atomic radii decrease down the group
2. They are highly electro-positive
3. They do not conduct electricity
4. They form ionic compounds with chlorine

50. Which of the following is/ are observed when a mixture of copper(II) oxide and charcoal is heated?

1. Reddish brown fumes
2. Colourless gas
3. Black residue
4. Brown residue

END

E.