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545/1

CHEMISTRY

Paper 1

Jul/Aug 2019

1½ Hours



MUKONO EXAMINATION COUNCIL

Uganda Certificate of Education

CHEMISTRY

Paper 1

1Hours30 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.

Use pen and write clearly.

For Examiner's Use Only

1. The best method that can be used to separate a mixture of simsim oil and water is;
- A. separating funnel
 - B. chromatography
 - C. filtration
 - D. crystallization
2. Which one of the following ions makes water hard?
- A. $\text{Na}^+(\text{aq})$
 - B. $\text{SO}_4^{2-}(\text{aq})$
 - C. $\text{HCO}_3^-(\text{aq})$
 - D. $\text{Mg}^{2+}(\text{aq})$
3. Which one of the following cations when in solution forms an insoluble salt with sodium sulphate solution?
- A. Al^{3+}
 - B. NH_4^+
 - C. Zn^{2+}
 - D. Pb^{2+}
4. Which one of the following substances will dissolve in water to give a solution that turns litmus blue?
- A. $\text{CH}_3\text{CH}_2\text{OH}$
 - B. NaCl
 - C. Na_2CO_3
 - D. K_2SO_4
5. Which one of the following is a characteristic of the element with electronic configuration 2:4?
- A: forms ions by electron loss
 - B: will form an acidic and a neutral oxide
 - C: does not conduct electricity
 - D: dissolves in a concentrated acid to give a salt and water
6. Which one of the following is observed when magnesium is burnt with nitrogen?
- A. A white solid is formed
 - B. A silvery grey solid is formed
 - C. A yellow solid is formed
 - D. A grey solid is formed.
7. Which one of the following hydrocarbons is unsaturated?
- A. C_2H_6
 - B. C_3H_6
 - C. C_3H_8
 - D. C_4H_{10}
8. 2.40g of magnesium reacted completely with excess hydrochloric acid. Magnesium reacts with hydrochloric acid according to the following equation;
- $\text{Mg}(\text{s}) + 2\text{HCl}(\text{aq}) \longrightarrow \text{MgCl}_2(\text{aq}) + \text{H}_2(\text{g})$
- The maximum decrease in mass in this reaction is

A: 2.24g

B: 2.40g

C: 0.20g

D: 0.02g

9. Which one of the following allotropes of carbon is used in the extraction of iron?

- A. Coal
- B. Coke
- C. Charcoal
- D. Diamond

☐

10. Which one of the following salts can be prepared by direct synthesis method?

- A. $\text{Al}_2(\text{SO}_4)_3$
- B. CuSO_4
- C. FeS
- D. MgSO_4

☐

11. Which one of the following oxides is soluble in both dilute acid and dilute alkali?

- A. Calcium oxide
- B. Copper (II) oxide
- C. Aluminium oxide
- D. Magnesium oxide

☐

12. When chlorine gas is bubbled through iron (II) sulphate solution,

- A the brown solution remains
- B a yellow solution is formed
- C the green solution turns black
- D the brown solution turns green

☐

13. Which one of the following will displace Copper from Copper (II) sulphate solution?

- A. lead
- B. Silver
- C. Mercury
- D. Gold

☐

14. Which one of the following substances will not oxidize concentrated hydrochloric acid to chlorine?

- A. Potassium manganate (VII)
- B. Lead (IV) oxide
- C. Manganese (IV) oxide
- D. Lead (II) oxide.

☐

15. Which one of the following is observed when concentrated nitric acid is boiled with iron (II) sulphate solution? The colour of the solution changes from

- A. yellow to brown
- B. brown to green
- C. green to brown
- D. green to colourless

☐

16. Which one of the following substances is used both as a catalyst and an oxidizing agent?

- A copper (II) sulphate
- B finely divided iron
- C Vanadium (V) oxide
- D manganese (iv) oxide

☐

17. The formula of a compound is XPO_4 . The electronic configuration of X in the compound is

- A. 2:8
B. 2:8:3
C. 2:8:4
D. 2:8:5

10

18. Which one of the following substances is a mixture containing tin?

- A. Bronze
B. Brass
C. Steel
D. solder

11

19. 1.74gm of an oxide of formula Z_xO is found to contain 0.02moles of oxygen. The value of X is (Z=35.5)

- A) 7 B) 2 C) 4 D) 1

11

20. Which of the following metals forms a nitrate which on heating gives a nitrite as one of the products?

- A lead
C sodium
- B silver
D aluminium

10

21. Which of the following pairs of elements will combine together to form a compound of simplest formula YX_2 ?

	Atomic number of Y	Atomic number of X
A	18	9
B	11	17
C	9	19
D	20	9

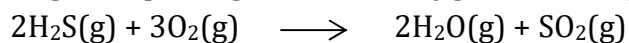
11

22. Which one of the following substance (s) is /are formed at the anode when potassium iodide solution is electrolyzed using graphite electrodes? □

- A. Water and oxygen
B. potassium and hydrogen
C. iodine only
D. potassium only

11

23. Hydrogen sulphide gas burns in oxygen according to the equation;



The volume of oxygen, at the same temperature and pressure, used up when 14.4 litres of hydrogen sulphide are completely burned at s.t.p is.

- A: 7.2 litres B: 21.60 litres C: 43.2 litres D: 9.6 litres

10

24. Which one of the following elements forms hydrogen with 0.01M nitric acid?

- A. Magnesium
B. Iron
C. Zinc
D. Copper

7

25. The gas which when passed over strongly heated iron can oxidize the iron to iron (II) only is
- A. oxygen
B. chlorine
C. carbon monoxide
D. hydrogen chloride
26. The percentage of water of crystallization in iron (II) sulphate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ is:
- A. $\left(\frac{126 \times 100}{278}\right)\%$
B. $\left(\frac{278 \times 100}{126}\right)\%$
C. $\left(\frac{126 \times 100}{152}\right)\%$
D. $\left(\frac{156 \times 100}{126}\right)\%$
27. The substance that can react with water at room temperature is;
- A. Magnesium
B. Calcium
C. Iron
D. Zinc
28. Which one of the following substances when added to distilled water would make it consume a lot of soap during washing?
- A sodium hydrogen carbonate
B potassium sulphate
C calcium sulphate
D sodium carbonate
29. A solution of copper(II) sulphate is electrolyzed using copper electrodes. The product at the positive electrode is;
- A. hydrogen
B. potassium
C. oxygen
D. copper(II) ions
30. Which one of the following salts can be prepared from its elements by direct synthesis?
- A. Potassium sulphate
B. Copper (II) carbonate
C. Iron (II) sulphide
D. Lead (II) nitrate
31. When 1.0g of carbon is burnt in excess oxygen, the heat produced raises the temperature of 400g of water by 19°C . The heat of combustion of carbon is
($C = 12$, S.H.C of water = $4.2\text{KJ Kg}^{-1}\text{K}^{-1}$)
- A. $0.4 \times 4.2 \times 19 \times 12 \text{ KJ Mol}^{-1}$
B. $400 \times 4.2 \times 19 \times 12 \text{ KJ Mol}^{-1}$
C. $\frac{0.4 \times 4.2}{12 \times 19} \text{ KJ mol}^{-1}$
D. $\frac{12 \times 19}{0.4 \times 4.2} \text{ KJ mol}^{-1}$
32. The trend which is observed on moving from left to right across a period in the periodic table is that the;

- A. metallic character increases
- B. number of energy levels decreases
- C. non-metallic character increases
- D. number of energy levels increase

☐

33. Which one of the following cations when in solution reacts with excess ammonia solution and forms a white precipitate?

- A. Cu^{2+} B. Zn^{2+} C. Fe^{2+} D. Al^{3+}

☐

34. 15cm^3 of a dibasic acid was neutralized by 30cm^3 of a 0.4M potassium hydroxide solution. The molarity of the acid is?

- A. $\left(\frac{2 \times 15}{0.4 \times 30}\right) \text{M}$ B. $\left(\frac{0.4 \times 30}{15 \times 2}\right) \text{M}$
- C. $\left(\frac{15 \times 0.4}{30 \times 2}\right) \text{M}$ D. $\left(\frac{2 \times 0.4 \times 30}{15}\right) \text{M}$

☐

35. Which one of the following polymers can be remoulded

- A. Rubber
- B. Nylon
- C. Polyester
- D. Polyethene

☐

36. Which one of the following factors does not affect the selection of an ion that is discharged at the electrodes during electrolysis?

- A. Reactivity of the metal
- B. Nature of electrode
- C. Surface area of electrode
- D. Concentration of electrolyte

☐

37. Which one of the following substances is not used in the softening of water?

- A. Chlorine
- B. Permutit
- C. Sodium carbonate
- D. Calcium hydroxide

☐

38. The table below shows the atomic mass, atomic number and number of neutrons in the nucleus of the atoms M, Q, R and T.

Atom	M	Q	R	T
Atomic mass	29	31	12	13
Atomic number	13	15	6	6
Number of neutrons	16	16	6	7

Which one of the following pairs of atoms belongs to the same element?

- A. M and Q
- B. M and T
- C. R and T
- D. Q and T

☐

39. 15g of an oxide of lead is strongly heated in a stream of hydrogen gas, leaving 13g of metallic lead. Determine the empirical formula of the oxide of lead.

- A. PbO
C. PbO₂

- B. PbO₃
D. Pb₂O₃

☐

40. The substance which does not produce carbon dioxide when heated strongly is

- A. Sodium hydrogencarbonate
B. Potassium hydrogencarbonate
C. Sodium carbonate
D. Calcium carbonate

☐

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.

Select.

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

41. Ammonia gas can be collected by upward delivery during preparation **because** It is less dense than air.

☐

42. An element with atomic number 20 belongs to group (II) of the periodic table **because** It is a metallic element

☐

43. During the manufacture of chlorine by electrolysis of brine, the cathode is made of iron. **because** chlorine gas is soluble in water

☐

44. Concentrated sulphuric acid is commonly used as a drying agent **because** The acid is hygroscopic

☐

45. Coke is used to extract iron **because** Coke is an oxidising agent from its ore.

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 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.

46. Which of the following is used to test for water of crystallization?

- 1. Copper (II) sulphate
- 2. Potassium dichromate
- 3. Cobalt (II) chloride
- 4. Potassium permanganate

47. Carbon is similar to Sulphur in that both

- 1. are non-metallic solids
- 2. exists in allotropic forms
- 3. form covalent compounds
- 4. form neutral oxides

48. The atomic number of an element **X** is 15. The formulae of the compound(s) that can be formed when **X** reacts with chlorine is/are

- 1. XCl_2
- 2. XCl_3
- 3. XCl_4
- 4. XCl_5

49. Which one of the following nitrate(s) when heated strongly will give off brown gas?

- 1. Copper nitrate
- 2. Potassium nitrate
- 3. Lead nitrate
- 4. Ammonium nitrate

50. Which of the following compounds, when dissolved in the solvent indicated will form a solution(s), which is/are (an) electrolyte(s).

- 1. Ethanol in water
- 2. Hydrogen chloride in aqueous ammonia.
- 3. Hydrogen chloride in methyl benzene
- 4. Nitrogen dioxide in water

END