Name …… Index No……

Signature ……

545/1
CHEMISTRY

JULY/AUG 2022

1 ½ HRS

BUGANDA EXAMINATIONS COUNCIL MOCKS 2022

UGANDA CERTIFICATE OF EDUCATION

CHEMISTRY

545/1

PAPER 1

TIME: 1½ HOURS

INSTRUCTIONS TO CANDIDATES:

- *This paper consists of fifty (50) objective questions.*
- *All questions are compulsory*
- *Answer the questions by writing the correct alternative **A. B, C** and **D** in the box on the right hand side of the question.*
- *Use pen and write clearly*
- *Do not use pencil*

For examiners use only

1. Which one of the following substances is **NOT** a constituent of air?
   A. Water vapour
   B. Dust particles
   C. Nitrogen
   D. Hydrogen

2. Which one of the gases will have no effect on hot copper (ii) oxide?
   A. Hydrogen
   B. Oxygen
   C. Ammonia
   D. Carbon monoxide

3. Which one of the following oxides will dissolve in ammonia solution?
   A. Copper (ii) oxide
   B. Calcium oxide
   C. Lead (ii) oxide
   D. Aluminum oxide

4. The anion which can rapidly be identified using lead (ii) nitrate as a reagent is;
   A. CO_3^{2-}
   B. Cl^-
   C. I^-
   D. SO_4^{2-}

5. The volume of nitrogen dioxide produced at s.t.p when 2.2g of lead (ii) nitrate is heated is?
   (N=14, O=16, Pb=207, 1mole of a gas occupies 22.4 dm^3 at s.t.p)
   A. $\left(\frac{2.2\times 22.4}{331}\right)dm^3$
   B. $\left(\frac{2.2\times 4\times 22.4}{331}\right)dm^3$
   C. $\left(\frac{2.2\times 4\times 22.4}{331\times 2}\right)dm^3$
   D. $\left(\frac{2.2\times 22.4}{2\times 331\times 4}\right)dm^3$

6. When extracting iron from iron (ii) carbonate (siderite) ore, the only process/reaction that occurs outside the blast furnace is?
   A. Removal of the major impurity in the ore
   B. Conversion of the carbonate to the oxide of iron
   C. Reduction of the ore
   D. Formation of carbon monoxide

7. The following gases are all soluble in water, except;
   A. Chlorine
   B. Ammonia
   C. Carbon monoxide
   D. Hydrogen chloride

8. Which one of the following sulphates **CANNOT** be prepared by the method of precipitation?
   A. Copper (ii) sulphate
   B. Silver sulphate
   C. Lead (ii) sulphate
   D. Barium sulphate

9. Which one of the following factors has no effect on the rate at which carbon dioxide is evolved when dilute hydrochloric acid reacts with marble chips?
   A. Concentration of reactants
   B. Catalyst
   C. Surface area of reactants
   D. Temperature

10. Equal volumes of solutions containing equi molar hydrogen ion concentrations of the following acids were measured out. Which one of the following acid solutions contained the least number of moles of hydrogen ions?
   A. Sulphuric acid
   B. Hydrochloric acid
   C. Nitric acid
   D. Ethanoic acid

11. Hydrogen reacts with nitrogen to form ammonia according to the following equation.
   $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
   The volume of the gas that would remain unreacted at equilibrium when 30 litres of hydrogen is reacted with 20 litres of nitrogen is?
   A. 5l
   B. 10l
   C. 15l
   D. 30l

12. The basicities of the following acids are the same, except that of;
   A. Nitric acid
   B. Ethanaic acid
   C. Sulphuric acid
   D. Hydrochloric acid

13. Which one of the following gases will form an aqueous solution, which reacts differently with litmus?
    A. HCl
    B. NO_2
    C. H_2S
    D. NH_3

14. Which one of the following methods is most suitable for separating a mixture of barium chloride and barium sulphate?
    A. Fractional crystallization
    B. Filtration
    C. Sublimation
    D. Decantation

15. Which one of the following gases need **NOT** be prepared in a fume cupboard or outdoors?
    A. Ethene
    B. Chlorine
    C. Carbon monoxide
    D. Hydrogen sulphide

16. Sulphuric acid reacts with sodium hydroxide according to the following equation;
    $H_2SO_{4\,(aq)} + 2NaOH_{(aq)} \longrightarrow NaSO_{4(aq)} + 2H_2O_{(l)}$
    Which one of the following is the volume of a 2M sulphuric acid required to react completely with $10cm^3$ of a 2M sodium hydroxide solution?
    A. 5.0 cm^3
    B. 80 cm^3
    C. 20.0 cm^3
    D. 40.0 cm^3

17. Which one of the following gases will **NOT** burn in air under any condition?
    A. Nitrogen
    B. Hydrogen
    C. Ammonia
    D. Carbon monoxide

18. Which one of the following elements reacts with hydrogen only when there is a catalyst?
    A. Oxygen
    B. Sulphur
    C. Nitrogen
    D. Chlorine

19. 0.4 g of metal hydroxide MOH reacted completely with 20 cm^3 of a 0.5M hydrochloric acid. The relative formula mass of MOH is?

A. $\frac{0.5\times 20}{0.4\times 1000}$

C. $\frac{1000\times 0.5}{0.4\times 20}$

B. $\frac{0.4\times 20\times 0.5}{1000}$

D. $\frac{0.4\times 1000}{0.5\times 20}$

20. Which one of the following properties is true about hydrogen chloride when dissolved in methylbenzene?
    A. reacts with ammonia forming a white precipitate
    B. decomposes carbonates into carbon monoxide
    C. conducts electricity
    D. reacts with litmus

21. Which one of the following gases reacts with copper (ii) oxide only under different conditions from the rest?
    A. Hydrogen
    B. Ammonia
    C. Hydrogen chloride
    D. Carbon monoxide

22. In which of the following reactions does sulphuric acid show a property which is different from the property in the other reactions? Reaction of the acid with;
    A. Ethanol to produce ethene
    B. Copper (ii) oxide forming copper (ii) sulphate
    C. Sugar forming sugar charcoal
    D. Copper (ii) sulphate crystal forming anhydrous salt

23. Which one of the following anhydrous chlorides is prepared by reacting dry hydrogen chloride with a metal?
    A. $CuCl_2$
    B. KCl
    C. $PbCl_2$
    D. $FeCl_2$

24. In which one of the following quantities of substances is the number of moles of the particle mentioned equal to the number of moles of hydrogen ions in 50 cm^3 of a 1M sulphuric acid?
(H=1, C=12, O=16, Na=23, S=32, K=39; 1 mole of a gas occupies 24.0 dm^3 at room temperature)

A. OH^- ions in 2g NaOH
B. Neon molecules in 2400 cm^3, measured at room temperature
C. Sulphur atoms in 1.6 g of sulphur
D. CO_3^{2-} ions in 6.9 g of K_2CO_3

25. Copper (ii) sulphate reacts with sodium carbonate according to the following equation;

$CuSO_{4(aq)} + Na_2CO_{3(aq)} \longrightarrow CuCO_{3(s)} + Na_2SO_{4(aq)}$

The mass of copper (ii) carbonate that is formed when 200 cm^3 of a solution containing 5.3 g of sodium carbonate per litre of solution was reacted completely with copper (ii) sulphate is given by the expression;
(C=12, O=16, Na=23, Cu=64, S=32)

A. $\frac{5.3\times200\times124}{106\times1000}g$
B. $\frac{5.3\times124\times1000}{106\times200}g$
C. $\frac{106\times200\times124}{5.3\times1000}g$
D. $\frac{106\times124\times1000}{5.3\times200}g$

26. Which one of the following substances is fed into the blast furnace from the bottom during the extraction of iron?

A. Limestone
B. Coke
C. Hot air
D. The ore

27. Which one of the following substances is **NOT** used in a laboratory preparation of a coke of soap?

A. Potassium hydroxide
B. Sodium chloride
C. A catalyst
D. Fat

28. 12.7 g of metal R reacts completely with 11.3 g of oxygen to form an oxide. Which one of the following is the formula of the oxide of R?
(O=16, R=27)

A. RO_2
B. R_2O
C. R_2O_3
D. R_3O_2

29. Which one of the following observations stands out as an advantage of hard water?
Hard water
A. leads to excessive use of fuel
B. prevents lead poisoning in water pipes
C. leaves white spots on linens
D. requires more soap for domestic use

30. All the substances mentioned below are oxidizing agents, except;
A. Carbon
B. Chlorine
C. Concentrated Nitric acid
D. Concentrated Sulphuric acid

31. The nitrogen used in the manufacture of ammonia by the Haber process is
A. Prepared by reducing copper (ii) oxide with ammonia
B. Obtained by burning ammonia in excess oxygen
C. Extracted from plant enzymes
D. Obtained from the air

32. Which one of the following uses of ammonia is **NOT** on an industrial scale?
A. making smelling salts
B. preparing nitrogen fertilizers
C. softening hard water
D. making explosives

33. Which one of the following uses of hydrogen is more likely to be phased out due to the explosive nature of the gas?
A. Hydrogenation of coal in making petrol
B. Filling weather balloons
C. Manufacturer of ammonia
D. Hardening oils for making fats

34. Which one of the following is the number of moles of hydrogen ions in 100 cm^3 of a 0.05M sulphuric acid?
A. 0.0025 moles
B. 0.01 moles
C. 0.25 moles
D. 1.00 moles

35. Which one of the following is **NOT** a property of ethene? Ethene
    A. Polymerizes
    B. undergoes combustion
    C. decolorizes bromine
    D. is soluble in water

36. Butane burns in air according to the following equation;

$$2C_4H_{10(g)} + 13O_2 \longrightarrow 8CO_{2(g)} + 10H_2O_{(l)}$$

Which one of the following would be the mass of batane that would burn to produce 1150kJ of heat?
(H=1, C=12, molar enthalpy of combustion of butane=2877 $KJmol^{-1}$)

A. $\left(\frac{2877\times1150}{58}\right)$ g

C. $\left(\frac{58\times1150}{2877}\right)$ g

B. $\left(\frac{2877\times58}{1150}\right)$ g

D. $\left(\frac{2877}{58\times1150}\right)$ g

37. Which one of the following cations will **NOT** complex with ammonia?
    A. Zn^{2+}
    B. Pb^{2+}
    C. Cu^{2+}
    D. Ag^{+}

38. The form of amorphous carbon that is used for making shoe-polish is;
    A. Lampblack
    B. Soot
    C. Coal
    D. Sugar charcoal

39. Which one of the following substances is formed as a residue when hydrated iron (ii) sulphate is strongly heated?
    A. Iron
    B. Iron (ii) oxide
    C. Iron (iii) oxide
    D. Triiron tetraoxide

40. Whine one of the following cations will not form a carbonate when reacted with aqueous sodium carbonate?
    A. $Ca^{2+}_{(aq)}$
    B. $Ba^{2+}_{(aq)}$
    C. $Fe^{3+}_{(aq)}$
    D. $Mg^{2+}_{(aq)}$

In answering question 41 to 45, mark

A. If responses 1, 2 and 3 are the correct ones
B. If responses 1 and 3 are the ones correct
C. If responses 2 and 4 are the ones correct and
D. It responses 4 is the only one correct

SUMMARY

Letter	Correct response (s)
A	1,2 and 3 only
B	1 and 3 only
C	2 and 4 only
D	4 only

41. Which one of the flowing lead salts dissolve (s) more in water with increase in temperature?
    1. $PbSO_4$
    2. $PbCO_3$
    3. PbI_2
    4. $PbCl_2$

42. The carbonate which will react with dilute hydrochloric acid with precipitation is /are
    1. $BaCO_3$
    2. Ag_2CO_3
    3. $CuCO_3$
    4. $PbCO_3$

43. Which one of the following compounds of lead (ii) is /are coloured?
    1. PbO
    2. $PbBr_2$
    3. PbI_2
    4. $Pb(NO_3)_2$

44. Which one of the following conditions would enhance the yield of sulphur trioxide during manufacture of sulphuric acid by the contact process?

1. High pressure
2. Excess oxygen
3. Presence of a catalyst
4. High temperature

45.Which one of the following elements is/are allotropic?

1. Aluminium
2. Sulphur
3. Sodium
4. Carbon

In questions 46 to 50 each consists of a assertion and a reason. Mark Select.

A. if both the **ASSERTION** and **REASON** are true, and the **REASON** is a correct explanation of the **ASSERTION.**

B. if both the **ASSERTION** and **REASON** 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.

Summary

ASSERTION	**REASON**
A. True	True, and correct explanation of assertion
B. True	True, not correct explanation of Assertion
C. True	False
D. False	True

46.Sodium chloride is used during Preparation of soap **Because** the salts enhances solidification of soap.

47.Lime water is a saturated calcium Hydroxide solution, which is most Suitable for confirming presence of carbon dioxide. **Because** calcium hydroxide is a strong base.

48. The concentration of hydrogen Peroxide which is stored in a transparent bottle will not change.	**Because**	hydrogen peroxide readily decomposes when mixed with a Catalyst.	
49. Chlorine is not dried using Calcium oxide.	**Because**	chlorine forms a complex with calcium oxide	
50. Concentrated sulphuric acid has no effect on litmus paper however, when the acid is left exposed to air it eventually turns blue litmus paper red.	**Because**	the acid absorbs atmospheric water in which it dissolves, hence enabling its ionization as well as dissociation	

END