Name: .....Centre/Index No: .....

Signature: .....

545/1
CHEMISTRY
Paper 1
1 ½ hours

DEPARMENT OF CHEMISTRY

PRE MOCK EXAMINATION

Uganda Certificate of Education

CHEMISTRY

Paper 1

1 hours 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. An example of the gas which acts as an oxidizing agent is;
   A. Hydrogen
   B. Carbon monoxide
   C. Ammonia
   D. Chlorine

2. Which one of the following salts is soluble in water?
   A. Lead II carbonate
   B. Zinc carbonate
   C. Potassium carbonate
   D. Calcium carbonate

3. X is an element with relative atomic mass 79. Its oxide contains 71.2% of X. the simplest formula of the oxide of X is?
   A. XO
   B. XO_2
   C. XO_3
   D. XO_4

4. Which one of the following oxides decomposes on heating?
   A. HgO
   B. CaO
   C. K_2O
   D. D. CuO

5. Which one of the elements with the following electronic configurations reacts most vigorously with water?
   A. 2:8:1
   B. 2:8:2
   C. 2:8:8:2
   D. 2:8:8:1

6. Which of the following will result in the oxidization of halide ions?
   A. Iodide added to hydrochloric acid
   B. Chlorine added to aqueous hydrogen iodide
   C. Bromine added to aqueous sodium chloride
   D. Chlorine added to aqueous sodium chloride

7. 25 cm^3 of 0.2 M potassium hydroxide solution was found to react completely with 0.2 M sulphuric acid. The volume of sulphuric used is;

A. $\frac{0.2 \ x \ 25}{0.4}$ cm^3

B. $\frac{0.2 \ x \ 0.4}{25}$ cm^3

C. $\frac{25 \ x \ 0.4}{0.2}$ cm^3

D. $\frac{25}{0.2 \ x \ 0.4}$ cm^3

8. Which one of the following oxides can react with sodium hydroxide?

A. Al_2O_3

B. MgO

C. FeO

D. CaO

9. The number of moles of hydroxide ion contained in 10 g of calcium hydroxide, $Ca(OH)_2$, is, (Ca = 40, O = 16, H = 1)

A. 0.135

B. 0.175

C. 0.270

D. 0.350

10. Iron(II) carbonate heated strongly. State what is observed.

A. A colourless gas is evolved

B. The blue solid turns to black

C. The green solid turns to black

D. Lime water turns to milky

11. Element M forms an ion of formula $\mathbf{M^{3+}}$**.** The atomic number of **M** is;

A. 13

B. 15

C. 3

D. 5

12. Nitrogen is relatively unreactive because;

A. It has five electrons in the outer most shell

B. It reacts by only gaining three electrons

C. It has strong triple bond
D. It is a non – metal

13. Which of the following gases reduces iron(III) oxide to iron?
A. Carbon dioxide
B. Nitrogen dioxide
C. Carbon monoxide
D. Nitrogen monoxide

14. Which of the following reactions proceeds faster at ordinary conditions?
A. Zinc carbonate and nitric acid
B. Iron and water
C. Magnesium and chlorine
D. Lead (II) oxide and hydrogen

15. Which of the following gases is most soluble in water?
A. O_2
B. Cl_2
C. NH_3
D. SO_2

16. 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+}

17. The symbol of an ion of an element is ${}^{37}_{17}X^{-}$. Which one of the following is the number of electrons in the ion?
A. 19
B. 18
C. 37
D. 17

18. The relative atomic mass of chlorine is often quoted as 35.5. It is not a whole number because;
A. Chlorine contains isotopes
B. Chlorine contains allotropes

C. There are impurities in chlorine
D. The number of neutrons and protons is not equal.

19. Which of the following gases decolourizes an acidified solution of potassium manganate VII when bubbled through it?
A. Ethane
B. Sulphur dioxide
C. Hydrogen chloride
D. Chlorine

20. Calculate the number of moles contained in 40g of iron (III)sulphate.
A. 0.2 moles
B. 0.1 moles
C. 0.3 moles
D. 0.4 moles

21. Lead II nitrate reacts with potassium iodide according to the following equation;
$Pb(NO_3)_{2(aq)} + 2KI_{(aq)} \longrightarrow PbI_{2(s)} + 2KNO_{3(aq)}$
Which one of the following is the mass of lead II iodide formed when 33.2g of potassium iodide is reacted with excess lead (II) nitrate? (K = 39, I = 127, Pb = 207)
A. 4.61 g
B. 46.10 g
C. 9.22 g
D. 92.2 g

22. Which one of the following is the method that can be used to separate a mixture of sodium chloride and ammonium chloride?
A. Distillation
B. Magnetization
C. Sublimation
D. Filtration

23. Magnesium reduces the oxide of a metal Y, and Y displaces copper from its salts. The order of reactivity of the metals is
A. Cu , Y, Mg
B. Mg , Cu, Y
C. Mg, Y, Cu
D. Y, Mg, Cu

24. Which of the following reactions take place at the cathode during electrolysis of dilute sulphuric acid using platinum electrode?

A. $2H^+(aq) + 2e \longrightarrow H_2(g)$

B. $SO4^{2-}(aq) + 2H^+(aq) \longrightarrow H_2SO_4(aq)$

C. $4OH^-(aq) + 4e^- \longrightarrow H_2O(l) + O_2(g)$

D. $H^+(aq) + OH^-(aq) \longrightarrow H_2O(l)$

25. What volume of a 0.2 M sodium hydroxide solution would be required to completely precipitate iron(III) hydroxide from 2 cm^3 of a 0.1 M solution of iron III ion? (Fe=56)

A. 0.5 cm^3

B. 1.0 cm^3

C. 2.0 cm^3

D. 3.0 cm^3

26. Which one of the following carbonates can be used to soften hard water?

A. $(NH_4)_2CO_3$

B. $NaHCO_3$

C. Na_2CO_3

D. $CaCO_3$

27. Copper reacts with concentrated sulphuric acid according to the following equation;
$Cu(s) + 2H_2SO_4(l) \longrightarrow CuSO_4(aq) + 2H_2O(l) + SO_2(g)$
Calculate the volume of sulphur dioxide in litres at s.t.p produced when 5.7 g of copper reacts with concentrated sulphuric acid. (Cu = 64, 1 mole of gas occupies 22.4dm^3 at s.t.p)

A. $\frac{64 \ x \ 5.7}{22.4}$

B. $\frac{64}{22.4 \ x \ 5.7}$

C. $\frac{22.4 \ x \ 64}{5.7}$

D. $\frac{22.4 \ x \ 5.7}{64}$

28. Scum is formed by;

A. dirty water being used.

B. presence of sulphate and bicarbonate

C. presence of magnesium and calcium ions

D. poor quality of soap reacting with impurities.

29. The equation below shows an equilibrium reaction;

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

If the pressure is increased, what is the effect on the yield of sulphur trioxide theoretically?

A. Increase
B. Decrease
C. Remains unchanged
D. Doubles

30. Which of the following ions when reacted with aqueous lead(II) nitrate forms a precipitate which dissolves on heating?

A. OH^-
B. SO_4^{2-}
C. Cl^-
D. CO_3^{2-}

31. Which one of the following is not a property of the product formed when a mixture of ammonium chloride and calcium hydroxide is heated?

A. It is soluble in water
B. It is less dense than air
C. It reduces copper (II) oxide to copper
D. It does not burn in oxygen

32. A separating funnel is used in the laboratory to separate;

A. Sand from oil
B. Oil from water
C. Sulphur from iron
D. Petrol from diesel

33. Which of the following is true about water?

A. It is a compound of hydrogen and oxygen
B. It is a liquid at all temperatures
C. It is a mixture of hydrogen and oxygen
D. It is a gas at room temperature

34. Hydrogen burns in air according to the following equation;

$H_2(g) + \frac{1}{2}O_2(g) \longrightarrow H_2O(l)$; $\Delta H = -286$ kJmol^{-1}.

The quantity of heat liberated when 3.84 dm^3 of hydrogen was completely burnt in air at room temperature is; (1 mole of gas occupies 24.0 dm^3 at room temperature)

A. 11.44 kJ
B. 22.88 kJ
C. 45.76 kJ
D. 91.52 kJ

35. A metallic bond is formed when a;
A. Metal loses electrons which are gained by non – metals
B. Metal gains electrons
C. Metal loses its mobile electrons
D. Metal loses its valence electrons

36. When a gas **Y** with a pungent smell was passed over heated platinum wire, a colourless gas **X** was formed, Gas **X** turned brown on reacting with air. Gas **Y** is likely to be;
A. Chlorine
B. Ammonia
C. Sulphur dioxide
D. Hydrogen chloride

37. Barium chloride solution was added to a solution of salt **H**. A white precipitate was formed which dissolved in excess dilute nitric acid. The anion in the salt could be;
A. SO_4^{2-}
B. HSO_4^-
C. Cl^-
D. CO_3^{2-}

38. The nuclear composition of four atoms **W**, **X**, **Y** and **Z** are shown in the table below;

Atom	**W**	**X**	**Y**	**Z**
Number of protons + Neutrons	12	23	14	24
Number of neutrons	6	11	6	12

Which of these atoms are isotopes?
A. W and Y
B. W and Z
C. X and Z
D. Z and Y

39. In which of the following reactions does sulphuric acid act as a dehydrating agent?
Reaction with;

A. Copper
B. Zinc carbonate
C. Hydrated copper II sulphate
D. Sodium chloride

40. Which one of the following will dissolve in excess aqueous ammonia?

A. $Pb(OH)_2$
B. $Al(OH)_3$
C. $Zn(OH)_2$
D. $Fe(OH)_3$

In each of the questions 41 to 45, one or more 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

41. Element Z has atomic structure $^{14}_{7}Z$. The element;

1. Is a non metal
2. Has a relative atomic mass of 14
3. Reacts by gain of electrons
4. Has two electrons in the outer most shell

42. Which of the following can affect the rate of reaction of gases?

1. Pressure
2. Surface area
3. Temperature
4. Size of the molecules

43. Which of the following has / have a giant molecular structure?

1. Sulphur
2. Graphite
3. Phosphorous
4. Diamond

44. Which of the following nitrates will form nitrogen dioxide when strongly heated?
    1. Calcium nitrate
    2. Sodium nitrate
    3. Copper(II) nitrate
    4. Ammonium nitrate

45. When magnesium is burnt in air;
    1. There is an increase in mass
    2. Bright light is observed
    3. Magnesium nitride is formed
    4. There is a decrease in mass

Each of the questions 46 to 50 consists 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 is 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 incorrect but the reason is a true statement.

Instructions summarized	
Assertion	**Reason**
A. True	True (reason is correct explanation)
B. True	True (reason is not correct explanation)
C. True	Incorrect statement
D. Incorrect	True statement

46. Ammonium chloride and sodium chloride are separated by sublimation. **BECAUSE** Sodium chloride and ammonium chloride have different melting point.

47. The number of protons in an atom is equal to the number of neutrons. **BECAUSE** The mass of a proton is approximately equal to that of a neutron

48.	When excess ammonia solution is added to copper(II) chloride solution, a deep blue solution is formed.	**BECAUSE**	Copper(II) hydroxide is ammonia solution.	
49.	A solution of carbon dioxide in water turns blue litmus paper red.	**BECAUSE**	Carbon dioxide is less dense than air.	
50.	Lead(II) chloride is prepared by precipitation.	**BECAUSE**	Lead(II) chloride is an insoluble salt.	

END