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545/1
CHEMISTRY
Paper 1
1½ hours

INTERNAL MOCK EXAMINATIONS

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. 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. XO₂
C. XO₃
D. XO₄
- ☐
4. A carbonate reacts with an acid according to the following equation;

$$\text{CO}_3^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) \longrightarrow \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$$
 Which one of the following would you expect to influence the rate at which carbon dioxide is evolved?
- A. Quantity of the acid
B. Size of the reaction vessel
C. Surface area of the carbonate
D. Quantity of the carbonate
- ☐
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. 25cm³ of 0.2M potassium hydroxide solution was found to react completely with 0.2M sulphuric acid. The volume of sulphuric used is;
- A. $\frac{0.2 \times 25}{0.4} \text{ cm}^3$
B. $\frac{0.2 \times 0.4}{25} \text{ cm}^3$
C. $\frac{25 \times 0.4}{0.2} \text{ cm}^3$
D. $\frac{25}{0.2 \times 0.4} \text{ cm}^3$
- ☐

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 10g of calcium hydroxide, $\text{Ca}(\text{OH})_2$, is, (Ca = 40, O = 16, H = 1)
A. 0.135
B. 0.175
C. 0.270
D. 0.350 ☐
10. Iron(II) carbonate was heated strongly. State what was 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 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. O₂
B. Cl₂
C. NH₃
D. SO₂ ☐
16. Which one of the following pairs of cations when in solution can be distinguished using potassium iodide solution?
A. Pb²⁺ and Al³⁺
B. Zn²⁺ and Al³⁺
C. Zn²⁺ and Fe²⁺
D. Fe²⁺ and Fe³⁺ ☐
17. The symbol of an ion of an element is ${}_{17}^{37}\text{X}^-$. 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;
$$\text{Pb}(\text{NO}_3)_{2(\text{aq})} + 2\text{KI}_{(\text{aq})} \longrightarrow \text{PbI}_{2(\text{s})} + 2\text{KNO}_{3(\text{aq})}$$

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. 4.61g
B. 46.10g
C. 9.22g
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 anode during electrolysis of dilute sulphuric acid using platinum electrode?
- A. $2\text{H}^+(\text{aq}) + 2\text{e}^- \longrightarrow \text{H}_2(\text{g})$
B. $\text{SO}_4^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) \longrightarrow \text{H}_2\text{SO}_4(\text{aq})$
C. $4\text{OH}^-(\text{aq}) + 4\text{e}^- \longrightarrow \text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$
D. $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \longrightarrow \text{H}_2\text{O}(\text{l})$
25. What volume of a 0.2M sodium hydroxide solution would be required to completely precipitate iron(III) hydroxide from 2cm^3 of a 0.1M solution of iron III ion? (Fe=56)
- A. 0.5cm^3
B. 1.0cm^3
C. 2.0cm^3
D. 3.0cm^3
26. Which one of the following carbonates can be used to soften hard water?
- A. $(\text{NH}_4)_2\text{CO}_3$
B. NaHCO_3
C. Na_2CO_3
D. CaCO_3

27. Copper reacts with concentrated sulphuric acid according to the following equation;
$$\text{Cu(s)} + 2\text{H}_2\text{SO}_4(\text{l}) \longrightarrow \text{CuSO}_4(\text{aq}) + 2\text{H}_2\text{O}(\text{l}) + \text{SO}_2(\text{g})$$

Calculate the volume of sulphur dioxide in litres at s.t.p produced when 5.7g of copper reacts with concentrated sulphuric acid. (Cu = 64)

- A. $\frac{64 \times 5.7}{22.4}$
B. $\frac{64}{22.4 \times 5.7}$
C. $\frac{22.4 \times 64}{5.7}$
D. $\frac{22.4 \times 5.7}{64}$

☐

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;
$$2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$$

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 chloride 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;
 $\text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \longrightarrow \text{H}_2\text{O}(\text{l}); \Delta H = -286 \text{ kJmol}^{-1}$.
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. SO_3^{2-}
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. $\text{Pb}(\text{OH})_2$
- B. $\text{Al}(\text{OH})_3$
- C. $\text{Zn}(\text{OH})_2$
- D. $\text{Fe}(\text{OH})_3$

☐

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 $^{14}_7\text{Z}$. 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. | <input type="checkbox"/> |
| 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 | <input type="checkbox"/> |
| 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. | <input type="checkbox"/> |
| 49. | A solution of carbon dioxide in water turns blue litmus paper red. | BECAUSE | Carbon dioxide is less dense than air. | <input type="checkbox"/> |
| 50. | Lead(II) chloride is prepared by precipitation. | BECAUSE | Lead(II) chloride is an insoluble salt. | <input type="checkbox"/> |

END