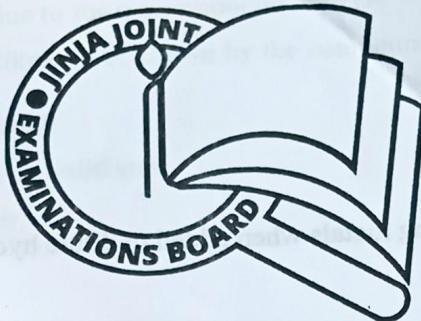


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CHEMISTRY
Paper 1
July / August, 2022
2 hours



JINJA JOINT EXAMINATIONS BOARD

Uganda Certificate of Education

MOCK EXAMINATION – JULY / AUGUST, 2022

CHEMISTRY

Paper 1

1 hour 30 Minutes

INSTRUCTIONS TO CANDIDATES

This paper consists of 50 objectives – type questions,

Answer all questions

You are provided to write the correct answer: A, B C or D in blue or black, ink in the box provided on the right-hand side of each question.

Do not use pencil. Any questions answered in pencil will not be marked.

FOR EXAMINER'S USE ONLY

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1. The process by which water vapour is changed into dew is called.

- A. evaporation
- B. efflorescence
- C. sublimation
- D. condensation

2. Which one of the following metals when added to dilute hydrochloric acid will NOT evolve hydrogen?

- A. Cu
- B. Mg
- C. Zn
- D. Fe

3. Metal X forms a soluble chloride, a soluble nitrate but an insoluble sulphate. Which one of the following metals could be X?

- A. Lead
- B. Sodium
- C. Calcium
- D. Copper

4. Which of the following contains only one kind of particles?

- A. Sea water
- B. Aluminium
- C. Air
- D. Duralumin

5. The atomic number of element E is 5. The electronic configuration of an element Q which belongs to the same group in the Periodic Table as E is

- A. 2.3
- B. 2.8.5
- C. 2.8.3

D. 2.8.1

6. Element X and Y combine to form a compound XY_2 ($X=24$ and $Y=17$). Which one of the following is a property likely to be shown by the compound XY_2 ? It

- A. has a low melting point
- B. conducts electricity in solid state
- C. is insoluble in water
- D. consists of ions

7. Sodium carbonate solution was separately added to solutions made by dissolving the following substances. With which substance was a white precipitate formed?

- A. NaNO_3
- B. $\text{Pb}(\text{NO}_3)_2$
- C. H_2SO_4
- D. NH_4Cl

8. Which of the following can NOT form an acidic salt?

- A. HCl
- B. H_2SO_4
- C. H_3PO_4
- D. H_2SO_3

9. The mass of ethane gas $\text{C}_2\text{H}_6(M_r=30)$ which will occupy the same volume as 8g of methane gas $\text{CH}_4(M_r=16)$ is

- A. $\frac{16 \times 8}{30}$
- B. $\frac{8 \times 30}{16}$
- C. $\frac{16 \times 30}{8}$
- D. $\frac{8 \times 18}{30}$

10. In which one of the following gases will magnesium burn to form a white solid that will react with water to form ammonia?

- A. NO₂
- B. N₂O
- C. O₂
- D. N₂

11. Hot concentrated sulphuric acid was added to a piece of copper foil and a colourless gas Z with an irritating smell was given off. The presence of Z could be confirmed using

- A. calcium hydroxide solution
- B. acidified potassium dichromate
- C. bromine water.
- D. concentrated hydrochloric acid.

12. Which one of the following substances has a simple molecular structure?

- A. Graphite
- B. Sodium chloride
- C. Diamond
- D. Hydrogen

13. The number of protons, neutrons and electrons in some particles are shown in the table below.

Particle	Protons	Neutrons	Electrons
E	8	8	10
H	9	10	10
K	3	4	2
M	6	6	6

Which one of the following particles represents a cation?

- A. K
- B. E

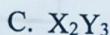
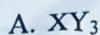
C. H
D. M

14. Which one of the following contains the same number of moles of hydrogen ions as are in 50cm^3 of 0.2M H_2SO_4 ?
- A. 100cm^3 of 0.5M HCl
 - B. 200cm^3 of 0.1M HNO_3
 - C. 500cm^3 of 0.5M HCl
 - D. 50cm^3 of 1M H_3PO_4
15. When substance X was added to some water in a beaker and soap solution added, a white precipitate was formed on shaking. X could have been.
- A. MgSO_4
 - B. NaHCO_3
 - C. Na_2CO_3
 - D. NaCl
16. Which one of the following is NOT an alkali?
- A. NaOH
 - B. K₂O
 - C. CuO
 - D. Ca(OH)₂
17. Magnesium carbonate reacts with dilute hydrochloric acid according to the following equation:
- $$\text{MgCO}_{3(\text{s})} + 2\text{H}^{+}_{(\text{aq})} \longrightarrow \text{Mg}^{2+}_{(\text{aq})} + \text{H}_2\text{O}_{(\text{l})} + \text{CO}_{2(\text{g})}$$
- Which one of the following is the mass of magnesium carbonate that would react completely with 100cm^3 of 2M hydrochloric acid solution? (C=12, O=16, Mg=24)
- A. $\left[\frac{2 \times 100}{1000} \times \frac{2}{84} \right] \text{g}$
 - B. $\left[\frac{1000}{2 \times 1000} \times \frac{84}{2} \right] \text{g}$

C. $\left[\frac{2x100}{1000} \times \frac{84}{2} \right] g$

D. $\left[\frac{2x1000}{100} \times \frac{2}{84} \right] g$

18. The atomic numbers of the elements X and Y are 13 and 8 respectively. Which one of the following is the formula of the compound formed between X and Y?



19. When gas X with a pungent smell was passed over hot platinum foil, a colourless gas that turned brown on mixing with air was formed.

X was



20. Which one of the following does NOT belong to the same homologous series as the others?



21. When 4g of a solid were heated, 300cm³ of gas measured at r.t.p and a solid residue of mass 3.34g was formed. The relative molecular mass of the gas is given by; (1 mole of gas occupies 24000cm³ at r.t.p)

A. $\left(\frac{300 \times 24000}{0.66} \right)$

B. $\left(\frac{0.66 \times 24000}{300} \right)$

C. $\left(\frac{4 \times 24000}{3.34} \right)$

D. $\left(\frac{3.34}{4} \times 24000 \right)$

22. When concentrated sulphuric acid was added to a salt, a colourless gas that formed misty fumes in damp air was given off. The anion present in the salt was,

A. SO_3^{2-}

B. Cl^-

C. NO_3^-

D. HCO_3^-

23. The heat produced when 0.38g of ethanol ($\text{C}_2\text{H}_5\text{OH}$) was completely burnt in oxygen raised the temperature of 100g of water from 25°C to 48.5°C . the molar heat of combustion of ethanol in kJmol^{-1} is
(specific heat capacity of water = $4.2\text{Jg}^{-1}\text{K}^{-1}$, H=1, C=12, O=16)

A.
$$\frac{46 \times 100 \times 4.2 \times 23.5}{0.38 \times 100}$$

B.
$$\frac{4.2 \times 48.5 \times 100}{0.38 \times 100}$$

C.
$$\frac{46 \times 100 \times 4.2 \times 23.5}{0.38}$$

D. $23.5 \times 4.2 \times 0.38 \times 1000$

24. Which one of the following salts can be prepared by neutralization of a base?

A. PbCl_2

B. CuSO_4

C. CaSO_4

D. AgCl

25. Select from the following an acid that can be conveniently used to prepare carbon dioxide from lead (II) carbonate.

A. Hydrochloric acid

Turnover

- B. Sulphuric acid
 C. Nitric acid
 D. Carbonic acid

26. Which one of the following substances will dissolve in water to form a solution whose pH is greater than 7?

- A. Na_2O
 B. CO_2
 C. NO_2
 D. NH_4Cl

27. The gas evolved when chlorine water is exposed to sunlight

- A. is more dense than air
 B. bleaches moist blue litmus paper
 C. re-lights a glowing splint
 D. turns moist blue litmus paper red

28. When dilute nitric acid was added to a solution of substance R followed by a few drops of lead (II) nitrate solution, a white precipitate was formed. The anion in R was

- A. CO_3^{2-}
 B. SO_3^{2-}
 C. S^{2-}
 D. SO_4^{2-}

29. Moist sulphur dioxide gas reacts with hydrogen sulphide according to the following equation;



Which one of the following statements is true about the reaction?

- A. Sulphur dioxide is the reducing agent.
 B. Hydrogen sulphide is reduced to water.

- C. Hydrogen sulphide is the oxidizing agent.
D. Sulphur dioxide is the oxidizing agent.

30. 560cm^3 of an oxide of nitrogen, N_xO_y , weigh 1.1g at s.t.p. The values of x and y are,
(N=14, O=16, 1 mole of gas occupies 22.4dm^3 at st.p)

- A. $x = 1, y = 1$
B. $x = 1, y = 2$
C. $x = 2, y = 1$
D. $x = 2, y = 4$

31. When a gaseous hydrocarbon was bubbled through acidified potassium manganate (VII) solution, the solution changed from purple to colourless. The hydrocarbon could have been,

- A. CH_4
B. C_2H_4
C. C_2H_6
D. C_4H_{10}

32. A mixture of sodium hydroxide and ammonium sulphate solution was heated and a gas M was evolved. Gas M

- A. turned moist blue litmus paper red
B. formed misty fumes on exposure to moist air
C. formed dense white fumes with hydrogen chloride gas
D. turned acidified potassium dichromate from orange to green

33. Silver nitrate decomposes according to the following equation:



What mass of silver nitrate must be heated in order to produce 896cm^3 of oxygen at s.t.p?
($\text{AgNO}_3 = 170$, 1mole of a gas occupies 22400cm^3 at s.t.p)

A. $\left(\frac{170 \times 896}{22400}\right) \text{g}$

$$\left[\quad \right]$$

B. $\frac{22400 \times 170 \times 2}{896}$ g

C. $\left[\frac{2 \times 170 \times 896}{22400} \right]$ g

D. $\left(\frac{22400 \times 170}{896 \times 2} \right)$ g

34. In which one of the following reactions does sulphuric acid react as an acid?



35. Copper (II) sulphate solution was electrolysed using carbon electrodes. Which one of the following statements is correct?

A. Hydrogen ions were discharged at the cathode

B. The blue colour of the solution faded

C. The mass of the anode decreased

D. A reddish brown deposit formed at the anode

36. 25cm³ of a dibasic acid was neutralized by 20cm³ of a 0.5M solution of sodium hydroxide. The molarity of the acid was.

A. $\frac{2 \times 25}{0.5 \times 20}$

B. $\frac{0.5 \times 20}{2 \times 25}$

C. $\frac{25 \times 0.5}{20 \times 2}$

D. $\frac{2 \times 0.5 \times 20}{25}$

37. When an excess of calcium carbonate reacts with dilute hydrochloric acid, the reaction gradually becomes slower and finally stops. Which one of the following statements best explains why this happens?

- A. The calcium carbonate is used up.
- B. The carbon dioxide gas exerts pressure on the acid solution.
- C. Both reactants get used up.
- D. The hydrochloric acid is gradually used up.
-
38. The molar heat of combustion of butane is 2880 kJ mol^{-1} . What volume of butane measured at s.t.p produces 1500kJ upon combustion?
(1mole of gas occupies 22.4 dm^3 at s.t.p).
- A. $\left(\frac{1500 \times 22.4}{2880} \right) \text{ dm}^3$
-
- B. $\left(\frac{22.4 \times 2880}{1500} \right) \text{ dm}^3$
-
- C. $\left(\frac{1500 \times 2880}{22.4} \right) \text{ dm}^3$
-
- D. $1500 \times 2880 \times 22.4 \text{ dm}^3$
-
39. Which one of the following would give the highest volume of hydrogen when reacted with excess Zinc powder at room temperature?
- A. 40 cm^3 of 2M hydrochloric acid
-
- B. 60 cm^3 of 1M hydrochloric acid
-
- C. 100 cm^3 of 1M hydrochloric acid
-
- D. 100 cm^3 of 0.5M hydrochloric acid
-
40. In the order of the reactivity of the elements; K, Na, Mg, Al, C, Zn and Cu, potassium is the most reactive and copper is the least reactive.
Which one of the following reactions is possible?

heat

- A. $2\text{Na}_2\text{O}_{(s)} + \text{C}_{(s)} \longrightarrow 4\text{Na}_{(s)} + \text{CO}_{2(g)}$
- B. $2\text{MgO}_{(s)} + \text{C}_{(s)} \xrightarrow{\text{heat}} 2\text{Mg}_{(s)} + \text{CO}_{2(g)}$
- C. $\text{Mg}_{(s)} + \text{CuO}_{(s)} \xrightarrow{\text{heat}} \text{MgO}_{(s)} + \text{Cu}_{(s)}$
- D. $2\text{Al}_{(s)} + 3\text{K}_3\text{O}_{(s)} \xrightarrow{\text{heat}} \text{Al}_2\text{O}_{3(s)} + 6\text{K}_{(s)}$

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 reason are true statements and the reason is a correct explanation of the assertion.
- B. If both the 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 not a correct statement.
- D. If the assertion is not correct but the reason is a correct statement

INSTRUCTIONS SUMMERISED

Assertion	Reason
A. True	True and is a correct explanation
B. True	True and is not a correct explanation
C. True	Incorrect
D. Incorrect	Correct

41. Calcium hydrogen carbonate causes permanent hardness of water Because Calcium hydrogen carbonate is an acid salt

42. Coke is used to extract iron from its ore Because Coke is an oxidizing agent

43. When chlorine is bubbled into potassium iodide solution, iodine is liberated. Because Iodine is less reactive than chlorine

44. 2M nitric acid is as strong acid as 2M ethanomeric acid

Because the acids have the same molarity

45. During the electrolysis of brine using carbon electrodes, chlorine is liberated at the anode

Because Chloride ions are higher in the electron chemical series than hydroxide ion

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. When hot concentrated sulphuric acid dehydrates ethanol, a gas is liberated. Which one of the following properties is/are shown by the gas?

- 1. It decolourises acidified potassium manganate (VII)
- 2. It is an unsaturated hydrocarbon.
- 3. It decolourises bromine water.
- 4. It forms a white precipitate with lime water.

47. Which of the following nitrates when heated, give(s) off nitrogen dioxide gas?

- 1. Zinc nitrate.
- 2. Silver nitrate.
- 3. Calcium nitrate.
- 4. Potassium nitrate.

48. Sulphur trioxide is converted to Sulphur trioxide in the contact process according to the following equation:



The yield of sulphur trioxide is increased by:

1. increasing pressure.
2. the presence of vanadium (V) oxide.
3. using excess oxygen.
4. Using high pressure

49. Which of the following can affect the rate of reaction involving gases?

1. Size of the molecules.
2. Temperature
3. Surface area
4. Using high pressure

50. A solution of potassium hydroxide was added to a solution of copper (II) sulphate and the mixture heated strongly. The find product(s) formed was/were.

1. CuO
2. Cu(OH)₂
3. K₂SO₄
4. K₂O

42. Coke is used to convert iron

43. When calcium is heated