Name..... Signature.....

School..... Index No.....

**545/1**
**CHEMISTRY**
**Paper 1**
**July/August 2015**
1 ½ hours

# WAKISSHA JOINT MOCK EXAMINATIONS

## Uganda Certificate of Education

## CHEMISTRY

## Paper 1

1 hour 30 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.*

*Do not use pencil.*

| *For examiner's use only* |
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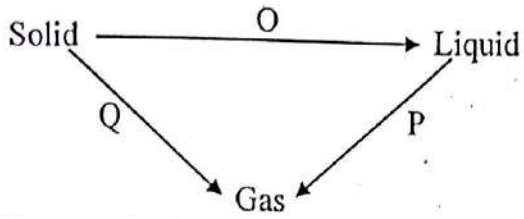
| |

1. Which one of the following is most suitable method for obtaining cream from milk?
   A. Chromatography.
   B. Centrifugation.
   C. Sublimation.
   D. Crystallisation.

2. Which of the following is not true about mixtures?
   A. Their properties are average.
   B. Their elements are chemically combined.
   C. Their substances are physically separated.
   D. Their composition is variable.

3. The diagram below shows the three physical states of matter.




   O, P and Q respectively represents;
   A. Melting, Sublimation, evaporation.
   B. Freezing, Condensation. evaporation.
   C. Sublimation, Condensation, melting.
   D. Melting, evaporation, sublimation.

4. The most efficient method for separating a mixture of sodium chloride and iron (iii) chloride is
   A. sublimation.
   B. decantation.
   C. filtration.
   D. crystallization.

5. Which of the following is an oxidation process only?
   A. Melting of candle.
   B. Rusting of iron.
   C. Displacement of copper ions by zinc metal.
   D. Formation of white precipitate by ammonia solution.

6. A substance which conducts electricity when molten but not when solid is
   A. a metalic element.
   B. non-metalic element.
   C. an ionic compound.
   D. a covalent compound.

7. Which one of the following is the correct order of purifying river water for domestic use?
   A. Aeration, filtration, sedimentation.
   B. Filtration, aeration, sedimentation.
   C. Sedimentation, aeration, filtration.
   D. Sedimentation, filtration, aeration.

8. A hydrocarbon compound consists of 82.76% carbon and rest being hydrogen. The simplest formula of the hydrocarbon compound is
   A. $C_2H_2$
   B. $CH_2$
   C. $C_2H_5$
   D. $C_4H_6$

9. Which one of the following pairs of ions forms Scum with soap solution?
   A. $Ca^{2+}$ and $Zn^{2+}$
   B. $Mg^{2+}$ and $Fe^{2+}$
   C. $Mg^{2+}$ and $Ca^{2+}$
   D. $Fe^{3+}$ and $Al^{3+}$

10. When heated strongly copper(II) nitrate leaves a solid residue. The colour of the residue is
   A. Reddish – brown (hot), grey (cold).
   B. Reddish – brown (hot), black (cold).
   C. Green (hot), black (cold).
   D. Black (hot), black (cold).

11. Which one of the following elements burns in air to form a solid that dissolves in water to form a colourless solution that turns blue litmus paper red?
   A. Phosphorus.
   B. Sodium.
   C. Sulphur.
   D. Magnesium.

12. What is the volume of 0.1M sodium hydroxide solution that will react completely with $10cm^3$ of 0.1M sulphuric acid, $2NaOH(aq) + H_2SO_4(aq) \longrightarrow Na_2SO_4 + H_2O(l)$
   A. $5\ cm^3$
   B. $10\ cm^3$
   C. $20\ cm^3$
   D. $25\ cm^3$

13. Which of the following is a monomer for proteins
   A. Urea.
   B. Glucose.
   C. Fructose.
   D. Amino acids.

14. The change from $Cu^{2+}$ to Cu involves the
   A. loss of protons.
   B. loss of electrons.
   C. gain of electrons.
   D. gain of protons.

15. When $100cm^3$ of 2M sodium hydroxide solution is neutralized with $100cm^3$ of 2M hydrochloric acid, the temperature rises by $2.6^0C$. The molar heat of neutralization of sodium hydroxide by hydrochloric acid is. Take C = 4.18J/g/$^0$C.
   A. 2.174kJ
   B. 10.4 kJ
   C. 2.48kJ
   D. 20.08kJ

16. Which of the following is the best explanation for increasing surface area of the reactants in the chemical reaction?
A. Increase the area of contact between reactants.
B. Increase the amount of reactants.
C. Increase the rate of collision of the particles.
D. Decrease the kinetic energy.

17. Hard water does not lather readily and leaves scum when treated with soap. This is because hard water contains
A. particles of insoluble calcium carbonate.
B. soluble salts of calcium and magnesium.
C. dissolved carbon oxide.
D. particles of insoluble sulphate.

18. 7.2 $dm^3$ of gas Q has a mass of 0.82g. Calculate the relative molecular mass of gas Q. [1 mole of a gas occupies 24 $dm^3$ at room temperature].
A. $\frac{0.82 \times 24}{7.2}$
B. $\frac{24 \times 7.2}{0.82}$
C. $\frac{0.82 \times 7.2}{24}$
D. $\frac{0.82}{24 \times 7.2}$

19. A solid when treated with dilute hydrochloric acid gives off a gas which turns limewater milky. This tells us that it
A. contained a carbonate.
B. was zinc carbonate.
C. contained powdered carbon.
D. was a mixture of carbon and metal oxide.

20. Chlorine gas can be prepared in the laboratory by heating concentrated hydrochloric acid with
A. Hydrogen peroxide.
B. Lead (II) oxide.
C. Copper(II) oxide.
D. Manganese (IV) oxide.

21. The number of moles of ammonium ions contained in 250$cm^3$ of 0.1M ammonium carbonate solution is.
A. 0.030
B. 0.050
C. 0.075
D. 0.925

22. Which of the following best explains the term anhydrous substance. It
A. never contains water.
B. is always a powder.
C. is not a salt.
D. always changes colour when water is put on it

23. The molecular formulae of the first three members of the alkane family are
A. $CH_3$, $C_2H_6$, $C_3H_8$
B. $CH_2$, $C_2H_4$, $C_3H_6$
C. $CH_4$, $C_2H_4$, $C_3H_8$
D. $CH_4$, $C_2H_6$, $C_3H_8$

24. Which of the following is the best description of an ore?
A. A purified metal.
B. The oxide of a metal.
C. A mixture of rock and a metal compound.
D. A mixture of a rock and a metal oxide.

25. Which of the following is observed in moving from left to right across a period in the periodic table?
A. Non-metalic character increases.
B. Metallic character increases.
C. Number of energy levels decreases.
D. Number of energy levels increases.

26. Sulphur reacts completely with concentrated nitric acid to form
A. Sulphur dioxide.
B. Hydrogen sulphide.
C. Sulphuric acid.
D. Sulphur trioxide.

27. What volume of air will provide enough oxygen for the complete combustion of 2g of phosphorus at room temperature [P = 31, 1 mole of gas = 24 $dm^3$ at room temperature]

$4P_{(s)} + 5O_{2(g)} \longrightarrow P_4O_{10(s)}$

A. 1.93 $dm^3$
B. 9.7 $dm^3$
C. 12 $dm^3$
D. 24 $dm^3$

28. What mass in grams of sodium carbonate deca hydrate $Na_2CO_3.10H_2O$) is contained in 100$cm^3$ of 0.1M solution. [Na = 23, H = 1, C = 12, O = 16]

A. $\frac{0.1 \times 10.6 \times 1000}{100}$

B. $\frac{106 \times 0.1 \times 100}{1000}$

C. $\frac{286 \times 0.1 \times 1000}{100}$

D. $\frac{286 \times 0.1 \times 100}{1000}$

29. Halogens are placed in the same group of the periodic table because they
A. are all gases at room temperature.
B. all have seven electrons in the outer most shell.
C. all form compounds with hydrogen.
D. all contain the same number of shells.

30. Starches and sugars belongs to the class of compounds known as
A. Allotropes.
B. Isotopes.
C. Hydrocarbons.
D. Carbohydrates.

31. Which of the following is formed when animal bone is heated without contact with air?
A. Magnesium Sulphate.
B. Iron(II) phosphate.
C. Calcium phosphate.
D. Zinc sulphate.

32. The substance that is produced at the anode when a concentrated solution of potassium iodide is electrolysed is,
A. potassium.
B. hydrogen.
C. oxygen.
D. iodine.

33. The formula of the Sulphate of an element Q is $Q_2(SO_4)_3$. The likely formula of the chloride of the same element is
A. $Q_2Cl$
B. $Q_3Cl$
C. $QCl_3$
D. QCl

The electronic configuration of the atoms of elements P, Q, R and S are 2:8:3, 2:8:5 2:8:7 and 2:8:8 respectively. Use it to answer question 34 and 35.

34. Which of the elements will combine to form compound that can conduct electricity in aqueous or molten form.
A. P and Q
B. P and R
C. Q and R
D. P and S

35. Which of the pairs of element form a covalent compound?
A. Q and R
B. P and Q
C. Rand S
D. P and S

36. In the blast furnance, iron is obtained from Iron (III) oxide according to the equation.
$Fe_2O_3 + 3CO_{(g)} \longrightarrow 2Fe_{(s)} + 3CO_{2(g)}$
The mass of iron obtained from 40tonnes of iron(III) oxide is [Fe =56, O =16, C =12]
A. 8 tonnes.
B. 14 tonnes.
C. 16 tonnes.
D. 28 tonnes.

37. The volume of ammonia gas at s.t.p that will be produced when $20cm^3$ of nitrogen reacts with hydrogen gas according to the equation $N_2(g), 3H_2(g) \longrightarrow 2NH_3(g)$
A. $10\ cm^3$
B. $20\ cm^3$
C. $30cm^3$
D. $40cm^3$

38. Separation of dyes of ink by chromatography depends on
A. The different boiling points of dyes in ink.
B. The freezing point of substances.
C. The solubility of the dyes in solvent.
D. The size of the chromatography paper.

39. Which one of the following is an example of a non-bio degradable substance?
A. Wood.
B. Silk.
C. Wool.
D. Polyethene.

40. The molarity of a solution made by dissolving 2.5g of sodium carbonate in $50cm^3$ of solution is (Na = 23, C= 12, O = 16)
A. 0.47M
B. 0.25 M
C. 0.35 M
D. 0.60M

***In each of the question 41 – 45 one / more of the answers may be correct. Read each question carefully and then indicate the correct answer as: A, B, C or D 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.

**Instructions Summarised.**

| A | B | C | D |
|---|---|---|---|
| 1, 2, 3 only | 1 and 3 only | 2 and 4 only | 4 only |

41. Which one of the following is /are uses of graphite?
1. Making drilling bits.
2. Making electrodes.
3. Making jewellery.
4. Making lubricants.

42. The yield of sulphuric acid in contact process is increased by:
1. Using moderate temperature.
2. The presence of vanadium (v) oxide.
3. Increasing pressure.
4. Using excess oxygen.

43. The following (are/is) use(s) of chlorine on a large scale.
1. Sewage treatment.
2. To bleach wood-pulp in paper making.
3. Preparation of soap.
4. In water purification.

Turn Over

44. Which of the following gas(es) is /are used as coolants in refrigerators?
1. Carbondioxide.
2. Sulphurdioxide.
3. Ammonia.
4. Chlorine.

45. During purification of river water for domestic use, aluminium sulphate is add to,
1. Kill viruses and bacteria.
2. Remove unwanted colours.
3. Add aluminium ions.
4. Coagulate fine suspended particles.

***Each of the following questions 46 – 50 consists of an assertion (statement) on the left hand side and a reason on the right hand side.***

**Select as follows.**

A. If both assertion and reason are **true** statements and the reason is the **correct** explanation of the assertion.
B. If both assertion and reason are **true** statements but the reason is **not** the **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 Summarised**

| | **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 |

| | | | | |
|---|---|---|---|---|
| 46. | Dilute nitric acid is not used in preparation of hydrogen. | Because | It oxidises hydrogen to water. | |
| 47. | Concentrated sulphuric acid changes sugar from white to black | Because | Concentrated sulphuric acid is an oxidizing agent. | |
| 48. | The enthalapy of combustion of butane is higher than that of ethane. | Because | Butane contains more carbon atom than ethane. | |
| 49. | Copper metal is extracted by electrolysis. | Because | Copper reacts with concentrated sulphuric acid to form copper(II) sulphate. | |
| 50. | Electrolysis of dilute sodium hydroxide solution produces oxygen and hydrogen gas. | Because | Sodium hydroxide solution consists of hydroxide ions and hydrogen ions. | |

**END**

Name..... Signature.....

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## Paper 1

1 hour 30 minutes.

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*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.*

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Turn Ove

1. Which one of the following substances will give up its water of crystalisation to the atmosphere when left in dry air?
   A. Hydrated copper (II) Sulphate.
   B. Hydrated Sodium carbonate.
   C. Phosphorus (V) oxide.
   D. Sodium hydrogen carbonate.

2. The red brown coating formed when iron is left in moist air for a long time is:
   A. Hydrated Iron (II) oxide.
   B. Hydrated iron (III) oxide.
   C. Anhydrous Iron (II) oxide.
   D. Anhydrous Iron (III) oxide.

3. Nitric acid prepared in laboratory is pale yellow because;
   A. It contains dissolved nitrogen (II) oxide.
   B. It is less concentrated.
   C. It is highly concentrated.
   D. It contains dissolved nitrogen (I) oxide.

4. Which one of the following is used during the manufacture of glass.
   A. Sodium carbonate.
   B. Calcium carbonate.
   C. Sodium hydrogencarbonate.
   D. Calcium hydrogencarbonate.

5. Which one of the following substances is produced when hydrogen chloride is passed over heated iron?
   A. Oxygen.
   B. Steam.
   C. Hydrogen.
   D. Chlorine.

6. Which one of the following compounds dissolves in water to form a solution with pH7
   A. $NaHCO_3$.
   B. $Na_2CO_3$.
   C. $CH_3COONa$.
   D. NaCl.

7. Which of the following pairs of substances will show the highest rate of production of carbon dioxide at room temperature?
   A. $10cm^3$ of 1M hydrochloric acid + 2g of powdered calcium carbonate.
   B. $10cm^3$ of 2M hydrochloric acid + 2g of powdered calcium carbonate.
   C. $10cm^3$ of 1M hydrochloric acid + 2g of lumps of calcium carbonate.
   D. $10cm^3$ of 2M hydrochloric acid + 2g of lumps of calcium carbonate.

8. When 5.74g of a hydrated salt X was heated, 3.22g of the anhydrous salt Y was formed. The number of moles of water of crystalisation is,
   (Y = 161, O = 16, H = 1)
   A. 2.
   B. 5.
   C. 7.
   D. 10.

9. The product formed after passing excess Sulphur dioxide through calcium hydroxide solution is used for;
   A. Bleaching the pulp in paper making.
   B. Vulcanisation of rubber.
   C. Killing bacteria during water purification.
   D. Improving soils as a fertilizer.

10. Which one of the following is the relative molecular mass of the gas if $8.4dm^3$ of the gas has a mass of 0.93g at s.t.p.
   A. $\frac{0.93 \times 22.4}{8.4}$.
   B. $\frac{22.4 \times 8.4}{0.93}$.
   C. $\frac{0.93 \times 8.4}{22.4}$.
   D. $\frac{0.93}{22.4 \times 8.4}$.

11. Which one of the following is observed when concentrated nitric acid is added to Iron (II) Sulphate solution?
   A. Brown precipitate.
   B. White precipitate.
   C. Brown solution.
   D. Colourless solution.

12. 2.0g of sodium hydroxide was dissolved in water to make $500cm^3$ of solution. The molarity of the solution is (Na = 23, O = 16, H = 1)
   A. 2M.
   B. 0.1M.
   C. 0.5M.
   D. 0.05M.

13. Which one of the following is **NOT** true about atoms $^{12}_{6}Z$ and $^{14}_{6}Y$?
   A. They have the same number of neutrons.
   B. They have the same number of protons.
   C. They are atoms of same element.
   D. They have same number of electrons.

14. Copper (II) carbonate can best be prepared by;
   A. Direct synthesis.
   B. Neutralization.
   C. Displacement.
   D. Precipitation.

15. Propene burns in Oxygen according to the following equation
   $2C_3H_{6(g)} + 9O_{2(g)} \longrightarrow 6CO_{2(g)} + 6H_2O$
   When 2.1g of propene is completely burnt in oxygen, the volume of carbon dioxide produced at room temperature is; (C = 12, H = 1)
   A. $1.2\ dm^3$.
   B. $2.4\ dm^3$.
   C. $3.4\ dm^3$.
   D. $4.8\ dm^3$.

16. The product given off at the positive electrode when an aqueous solution of copper (II) Sulphate is electrolysed using platinum electrodes is,
A. Oxygen.
B. Hydrogen.
C. Copper.
D. Sulphur dioxide.

17. Sodium hydroxide reacts with oxalic acid according to the following equation.
$2NaOH_{(aq)} + H_2C_2O_{4(aq)} \longrightarrow Na_2C_2O4_{(aq)} + 2H_2O_{(l)}$
The volume of 0.3M sodium hydroxide required to completely neutralize $25cm^3$ of a 0.1M solution of oxalic acid is,
A. 6.25
B. 12.50
C. 16.67
D. 25.10

18. Which one of the following formula represents an alkene?
A. $C_3H_8$
B. $C_4H_6$
C. $C_2H_6$
D. $C_4H_8$

19. The percentage of oxygen in $Na_2CO_3 . 10H_2O$ is (Na = 23, C = 12, O = 16, H = 1)
A. $\frac{48 \times 100}{106}$
B. $\frac{208 \times 100}{106}$
C. $\frac{48 \times 100}{286}$
D. $\frac{208 \times 100}{286}$

20. An ion $X^{2-}$ contains 18 electrons. The group and period to which X belongs in the periodic table is?
A. II and 2.
B. II and 3.
C. VI and 2.
D. VI and 3.

21. Which one of the following is a suitable method of separation of a mixture of Iron (III) chloride and sand?
A. Filtration.
B. Decantation.
C. Sublimation.
D. Using a magnet.

22. Which one of the following elements is a constituent of fertilizers?
A. Phosphorus.
B. Iodide.
C. Silver.
D. Copper.

23. Which one of the following pairs of elements form an ionic bond when reacted together?
A. Hydrogen and oxygen.
B. Potassium and bromine.
C. Sulphur and nitrogen.
D. Copper and aluminium.

24. When metal A was added to a solution of a Sulphate of metal B, metal B ions are precipitated. When metal C was added to a solution of Sulphate of B, no precipitate was observed.
Which of the following is the correct order of decreasing activity of the three metals?
A. B, C, A.
B. A, B, C.
C. B, A, C.
D. C, B, A.

25. An atom of element X has atomic mass 27 and neutrons number of 14. The formula of the oxide of X is?
A. $X_2O$.
B. $XO_2$.
C. $X_2O_3$.
D. $X_2O_5$.

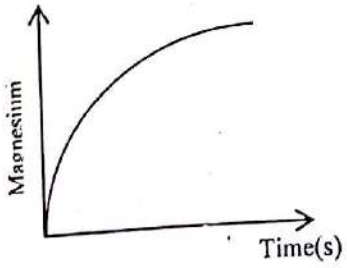
26. To an aqueous solution of W, magnesium Sulphate solution was added, there was no observable change, the resultant solution was boiled in a boiling tube.
A white precipitate was observed. The anion present in W is;
A. Carbonate.
B. Hydrogen Sulphite.
C. Hydrogen Sulphate.
D. Hydrogen carbonate.

27. Which one of the following is a monomer of rubber?
A. Isoprene.
B. Amino acid.
C. Glucose.
D. Ethene.

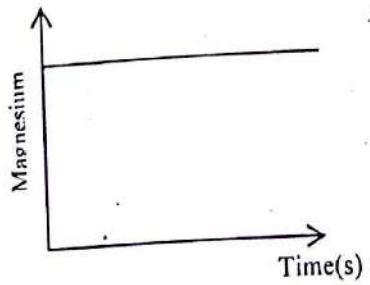
28. Which one of the following has a giant atomic structure?
A. Sulphur.
B. Iodine.
C. Diamond.
D. Phosphorus.

29. Magnesium ribbon was reacted with 2M Sulphuric acid according to the equation below.
$Mg_{(s)} + H_2SO_{4(aq)} \longrightarrow MgSO_{4(aq)} + H_{2(g)}$
The graph that shows the rate at which magnesium ribbon is used up with time is?

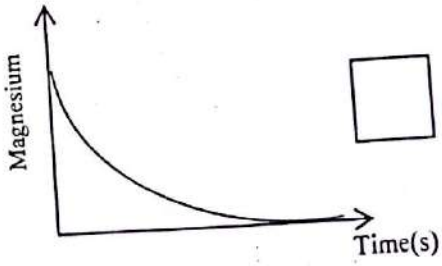
A.



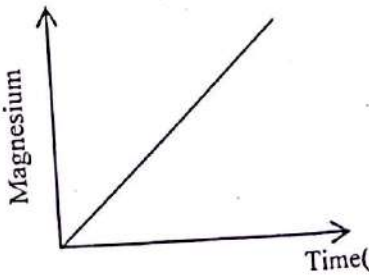

B.




C.




D.

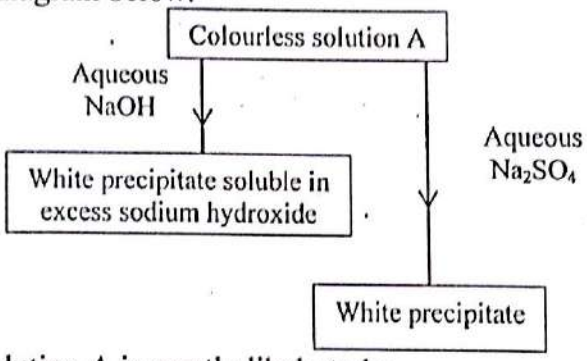


30. An element X belongs to group (II) in the periodic table. The formula of the hydrogen carbonate of X is?
A. $XHCO_3$
B. $X(HCO_3)_2$
C. $X_2(HCO_3)_3$
D. $X(HCO_3)_3$

31. Metal P and a non metal Q are elements in the period three of the periodic table. Which one of the following statements is **NOT** true about P and Q?
A. The atomic radius of Q is smaller than that of P.
B. The compound formed between P and Q conducts electricity in molten state.
C. The chloride of P is ionic while that of Q is covalent.
D. The oxide of Q is basic while that of P is acidic.

32. Sulphur dioxide burns in air according to the following equation.
$2SO_{2(g)} + O_{2(g)} \longrightarrow 2SO_{3(g)}$
The volume of Sulphur dioxide that burnt when $50cm^3$ of Sulphur dioxide was combined with $20cm^3$ of oxygen is;
A. $40cm^3$
B. $20cm^3$
C. $50cm^3$
D. $25cm^3$

33. Study the flow diagram below.




The cation in solution A is mostly likely to be
A. $Al^{3+}$.
B. $Mg^{2+}$.
C. $Ca^{2+}$.
D. $Pb^{2+}$.

34. Which one of the following forms a white sublimate when strongly heated?
A. Ethanol.
B. Iodide.
C. Ammonium chloride.
D. Ammonium Sulphate.

35. Which one of the following gases diffuses fastest?
A. $CO_2$.
B. $CH_4$.
C. $NO_2$.
D. $NH_3$.

36. Which one of the following compounds gives off oxygen when heated?
A. Copper (II) oxide.
B. Copper (II) carbonate.
C. Lead (IV) oxide.
D. Ammonium nitrate.

37. Which one of the following compound can soften hard water?
A. $Na_2CO_3$.
B. $CaCl_2$.
C. $MgSO_4$.
D. $Ca(HCO_3)_2$.

38. An oxide of an element is made up of 50% M. The simplest formula of the oxide is; (M = 32, O = 16)
A. MO.
B. $M_2O$.
C. $MO_2$.
D. $M_2O_3$.

39. Hydrogen is used on industrial scale to;
A. Make mining explosives.
B. Reduce metal oxides.
C. Make detergents.
D. Hardening vegetable oils.

40. Which one of the following nitrates does not produce an oxide when heated?
A. $Zn(NO_3)_2$.
B. $Mg(NO_3)_2$.
C. $NaNO_3$.
D. $Cu(NO_3)_2$.

***Each of the following questions 41 – 45 consists of an assertion (statement) on the left hand side and a reason on the right hand side.***

**Select as follows.**

A. If both assertion and reason are **true** statements and the reason is the **correct** explanation of the assertion.
B. If both assertion and reason are **true** statements but the reason is **not** the **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 Summarised**

| | **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 |

**Turn Over**

| | | | | |
|---|---|---|---|---|
| 41 | When Sulphur dioxide is bubbled through conc. Nitric acid brown fumes are observed | Because | Sulphur dioxide reduces the conc. Nitric acid to nitrogen (II) oxide. | |
| 42 | Metal extraction is essentially a reduction process | Because | Metal atoms readily gains electrons. | |
| 43 | Manganese (IV) oxide reacts with conc. Hydrochloric acid to produce chlorine gas. | Because | Manganese (IV) oxide is basic oxide. | |
| 44 | Conc. Sulphuric acid does **NOT** conduct electricity. | Because | It has a great affinity for water. | |
| 45 | Enthalpy of neutralization of weak acids and alkalis is less than 57KJ/mole | Because | Weak acids and alkalis are partially ionized. | |

***In each of the question 46 – 50 one / more of the answers may be correct. Read each question carefully and then indicate the correct answer as: A, B, C or D 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 / are not commercial uses of carbon dioxide?
    1. Manufacture of fire extinguishers.
    2. Manufacture of fizzy drinks.
    3. Manufacture of baking powder.
    4. Manufacture of industrial fuels.

47. The following substances are formed when ammonium nitrate is strongly heated.
    1. Nitrogen gas.
    2. Dinitrogen oxide.
    3. Ammonia.
    4. Steam.

48. The products of reaction of chlorine with cold dilute sodium hydroxide are;
    1. $H_2O$.
    2. NaCl.
    3. NaClO.
    4. $NaClO_3$.

49. Which of the following is /are true about a dilute mineral acid?
    1. Has a pH less than 7.
    2. Liberates Hydrogen gas from all metals.
    3. Liberates carbon dioxide from all carbonates.
    4. Turns colourless Phenolphlalein indicator pink.

50. When Phosphorous is burnt in oxygen?
    1. Burns with a bright flame.
    2. Forms an acid anhydride.
    3. Gains weight.
    4. Forms an insoluble oxide.

**END**

Name..... Signature.....

School..... Index No.....

545/1
CHEMISTRY
Paper 1
July/August 2017
1 ½ hours

# WAKISSHA JOINT MOCK EXAMINATIONS

## Uganda Certificate of Education

## CHEMISTRY

## Paper 1

1 hour 30 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.*

*Do not use pencil.*

| *For examiner's use only* |
| --- |
| |
| |

1. Which one of the following substances is not a mixture.
   A. Air.
   B. Water.
   C. Steel.
   D. Bronze.

2. The electronic configuration of four elements are W; 2:5, X; 2:8:1, Y; 2:4, Z; 2:8:8:1 The element which reacts most vigorously with cold water is
   A. X
   B. W
   C. Y
   D. Z

3. Compound Y when strongly heated produced a brown gas and a residue reddish - brown when hot that turned yellow on cooling. Y is mostly likely to be
   A. Zinc nitrate.
   B. Zinc nitrite.
   C. Lead nitrate.
   D. Lead nitrite.

4. When ammonia chloride was heated with calcium hydroxide, a gas C was given off. When the gas is treated with nitric acid it forms a compound used as
   A. a disinfectant.
   B. a cleanser.
   C. an explosive.
   D. a fertilizer.

5. Which of the following pair of substances can be separated by sublimation method?
   A. Iron (III) chloride and sodium chloride.
   B. Potassium chloride and sodium chloride.
   C. Iron (II) chloride and copper (II) chloride.
   D. Potassium chloride and copper (II) chloride.

6. An element Q has got atomic number 12. The oxide of Q is.
   A. amphoteric.
   B. basic.
   C. acidic.
   D. neutral.

7. Which one of the following salts can be prepared from its elements by direct synthesis?
   A. Potassium sulphate.
   B. Copper (II) sulphate.
   C. Magnesium chloride.
   D. Lead (II) nitrate.

8. Which of the following is observed when chlorine water is exposed to sunlight?
   A. Solution turns from green to yellow.
   B. A colourless gas that supports burning is evolved.
   C. A gas which bleaches litmus paper is evolved.
   D. A colourless gas that burns with pale blue colour is evolved.

9. $20.0cm^3$ of 0.1M of salt X reacted with $10cm^3$ of monobasic acid. If the mole ratio of salt and acid is 1:2. The molarity of the acid is
   A. 0.2M
   B. 0.8M
   C. 0.1M
   D. 0.4M

Which one of the following factors affects the rate of reaction between sodium thiosulphate solution and dilute hydrochloric acid?

A. Concentration.
B. Surface area.
C. Pressure.
D. Catalyst.

1. Carbon dioxide is formed according to the equation below;

$C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)} \Delta H = {}^{-}380 kjmol^{-1}$

The energy liberated when 20g of carbon dioxide is formed is [C = 12, O = 16].

A. $\frac{44}{20 \times 380}$ KJ

B. $\frac{380 \times 44}{20}$ KJ

C. $\frac{380 \times 20}{44}$ KJ

D. $\frac{20 \times 44}{380}$ KJ

12. Ammonium sulphate was dissolved in water. The solution formed

A. had no effect on litmus.
B. changed red litmus to blue.
C. bleached the litmus paper.
D. changed blue litmus to red.

13. In which of the following reactions does sulphur dioxide behave as an oxidising agent?
A reaction of sulphur dioxide with

A. Iron (III) chloride.
B. concentrated nitric acid.
C. acidified potassium dichromate.
D. moist hydrogen sulphide gas.

14. The electronic configuration of the ion of sodium is

A. 2:8:1
B. 2:8:8
C. 2:8
D. 2:8:2

15. Which one of the following salts when dissolved in water would give a solution which is neutral to litmus?

A. NaCl.
B. $NH_4Cl$.
C. $Na_2CO_3$.
D. $(NH_4)_2SO_4$.

16. The role of yeast during fermentation is to;

A. hydrate the sugars.
B. combine with sugar to form ethanol.
C. increase the temperature of sugar, for an increased production of ethanol.
D. provide enzymes that hydrolyse the sugar.

Turn Ove

17. Which one of the following would **NOT** form a precipitate when mixed?
A. Barium nitrate and sodium sulphate.
B. Lead (II) nitrate and potassium iodide.
C. Silver nitrate and potassium bromide.
D. Copper (II) nitrate and sodium sulphate.

18. Ammonia gas reacts with chlorine gas according to the equation.
$8NH_{3(g)} + 3Cl_{2(g)} \longrightarrow 6NH_4Cl_{(s)} + N_{2(g)}$
The volume of chlorine gas required for complete reaction with $10cm^3$ of ammonia gas is
A. $375cm^3$.
B. $37.5cm^3$.
C. $3.75cm^3$.
D. $26.7cm^3$.

19. Which of the following substance sublimes when heated?
A. Sulphur.
B. Solid carbon dioxide.
C. Phosphorous.
D. Water.

20. An organic compound Q has 40.0% carbon, 6.7% hydrogen the rest being oxygen. Given that the relative molecular mass of Q is 180. What is the number of hydrogen atoms in one molecule of Q. (C = 12, O = 16 , H= 1)
A. 24
B. 6
C. 12
D. 18

21. Which one of the following is NOT used in the extraction of iron?
A. Air.
B. Limestone.
C. Silicon.
D. Coke.

22. Chlorine can be prepared in the laboratory by heating concentrated hydrochloric acid with
A. Lead (II) oxide.
B. Iron (II) oxide.
C. Copper (II) oxide.
D. Lead (IV) oxide.

23. An element X reacts as follows;
A. $X^{2+}_{(aq)} + W_{(s)} \longrightarrow W^{2+}_{(aq)} + X_{(s)}$
B. $X_{(s)} + Y^{2+}_{(aq)} \longrightarrow Y_{(s)} + X^{2+}_{(aq)}$
C. $Z^{+}_{(aq)} + X_{(s)} \longrightarrow$ No reaction
D. $Z^{+}_{(aq)} + W_{(s)} \longrightarrow$ No reaction
The correct order of reactivity is
A. X > W > Y > Z
B. W > X > Y > Z
C. Z > W > X > Y
D. Y > Z > W > X

24. The percentage of water of crystallization in $Na_2S_2O_3.5H_2O$ crystals is
(Na = 23, O = 16, S = 32, H = 1)

A. $\frac{18\times100}{158}$

B. $\frac{90\times100}{248}$

C. $\frac{90\times100}{232}$

D. $\frac{90\times100}{158}$

25. Nitrogen reacts with hydrogen according to the equation below.

$N_{2(g)}+3H_{2(g)} \longrightarrow 2NH_{3(g)}+$ Heat .

Which one of the following pairs of conditions favour the above reaction?

A. low pressure and low temperature.
B. high pressure and high temperature.
C. low pressure and high temperature.
D. high pressure and low temperature.

26. Iron is usually galvanised before use because this

A. reduces the cost.
B. makes the iron structure stronger.
C. makes iron malleable.
D. makes iron rust free.

27. The mass of nitric acid required to make $200cm^3$ of a 2M solution is (H = 1, N = 14, O = 16)

A. 25.2g
B. 12.6g
C. 25.8g
D. 31.5g

28. Hydrogen sulphide in aqueous form is a reducing agent because

A. it is a weak acid.
B. the hydrogen ions gain electrons to form hydrogen gas.
C. the sulphide ions readily loose electrons to form a yellow deposit.
D. sulphur dioxide gas is always formed during the reaction.

29. Lead (II) carbonate decomposes according to the equation

$PbCO_{3(s)} \longrightarrow PbO_{(s)}+CO_{2(g)}$

The loss in mass when 26.7g of Lead (II) carbonate is decomposed is
(Pb = 207, O = 16, C = 12)

A. $\frac{44\times257}{26.7}g$

B. $\frac{267}{44\times26.7}g$

C. $\frac{44\times26.7}{267}g$

D. $\frac{26.7\times267}{44}g$

30. Solid Q dissolves in concentrated sulphuric acid with effervescence of colourless gas that fumes in moist air. The anion in Q is likely to be

A. nitrate.
B. carbonate.
C. chloride.
D. sulphate.

31. When one mole of ammonium chloride was dissolved in a certain volume of water, 2.94KJ of heat was absorbed. The amount of heat absorbed when 5.35g of ammonium chloride is dissolved in the same volume of water is (H = 1, N = 14, Cl = 35.5)

A. $\frac{53.5}{2.94 \times 5.35}$ KJ
B. $\frac{53.5 \times 5.35}{2.94}$ KJ
C. $\frac{2.94 \times 53.5}{5.35}$ KJ
D. $\frac{2.94 \times 5.35}{53.5}$ KJ

32. Which one of the following elements can burn in nitrogen?

A. Calcium.
B. Zinc.
C. Carbon.
D. Sulphur.

33. When concentrated sulphuric acid is added to ethanol, a colourless gas and a liquid are produced, This is because the acid is a strong

A. reducing agent.
B. dehydrating agent.
C. oxidizing agent.
D. corrosive agent.

34. Which one of the following is observed when ethene is bubbled through a solution of bromine. It turns from

A. red to colourless.
B. reddish brown to colourless.
C. yellow to brown.
D. brown to yellow.

35. Which one of the following ions would NOT precipitate out lead (II) ions from solution?

A. $NO_3^-$
B. $CO_3^{2-}$
C. $SO_4^{2-}$
D. $\bar{O}H$

36. Solids X and Y dissolve in cold water to liberate ammonia gas and Oxygen respectively. X and Y are likely to be

A. $Mg_3N_2$ and $Na_2O$
B. $NH_4Cl$ and $Na_2O$
C. $Mg_3N_2$ and $Na_2O_2$
D. $NH_4Cl$ and $Na_2O_2$

| | | | | |
|---|---|---|---|---|
| 42. | Hard water requires a lot of soap solution to form a lather. | because | some of the soap is initially used in removing magnesium ions. | |
| 43. | Sulphuric acid is a strong acid | because | its more volatile. | |
| 44. | Diamond and graphite have the same chemical properties | because | they are amorphous forms of carbon. | |
| 45. | A mixture of sodium chloride and sodium nitrate is best separated by fractional crystallization. | because | the salts have different melting points. | |

***In each of the question 46 – 50 one or more of the answers may be correct. Read each question carefully and then indicate the correct answer as: A, B, C or D 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.

**Instructions Summarised.**

| A | B | C | D |
|---|---|---|---|
| 1, 2, 3 only | 1 and 3 only | 2 and 4 only | 4 only |

46. Which of the following properties make carbon dioxide gas useful in fire extinguishers?
1. It is denser than air.
2. It is an inert gas.
3. It is non-inflammable.
4. It is lighter than air.

47. Which of the following is/are formed when chlorine is bubbled through cold dilute sodium hydroxide solution.
1. NaCl.
2. NaOCl.
3. $H_2O$.
4. HOCl.

48. Which of the following contains the same number of particles as there are hydroxide ions ($OH^-$) in $10cm^3$ of 0.2M sodium hydroxide solution?
(Al = 27, molar gas volume at s.t.p = $22400cm^3$, L = $6.02 X10^{23}$)
1. 0.054g of Al.
2. 0.002 moles of $O_2$.
3. $0.0448dm^3$ of $N_2$.
4. 0.003 moles of Pb.

49. Which of the following is/are the products of electrolysis of dilute copper (II) chloride solution using inert electrodes?
1. $H_2$.
2. $O_2$.
3. $Cl_2$.
4. Cu.

50. Which of the following nitrates when heated will decompose to form a metal?
1. Mercury (II) nitrate.
2. Copper (II) nitrate.
3. Silver nitrate.
4. Zinc nitrate.

**END**

Name..... Signature.....

School..... Index No.....

**545/1**
**CHEMISTRY**
**Paper 1**
**July/August 2018**
1 ½ hours

# WAKISSHA JOINT MOCK EXAMINATIONS

## Uganda Certificate of Education

## CHEMISTRY

## Paper 1

1 hour 30 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.*

*Do not use pencil.*

| *For examiner's use only* |
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| |
| |

1. A mixture of two soluble salts can be separated by;
   A. Filtration.
   B. Decanting.
   C. Fractional crystallization.
   D. Fractional distillation.

2. An element Q reacts with steam rapidly but reacts very slowly with cold water. Q is likely to be;
   A. Calcium.
   B. Magnesium.
   C. Sodium.
   D. Potassium.

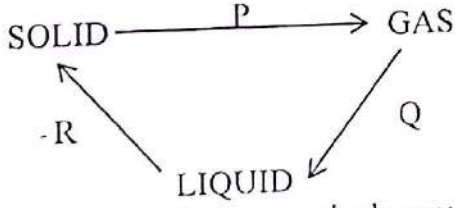
3. Element X forms a covalent oxide of formula $XO_2$, the group to which X belongs in the periodic table is;
   A. I.
   B. II.
   C. III.
   D. IV.

4. A hydrocarbon T consists of 85.7% carbon, if the molecular mass of T is 28, the atomicity of T is? (C = 12, H = 1)
   A. 8.
   B. 6.
   C 4.
   D 2.

5. Electrolysis of dilute aqueous solution of $X^{2+}$ and $Y^{2+}$ separately using inert electrodes liberates hydrogen gas and Y at the cathode respectively. Another element Z reduces $X^{2+}$ in solution. The order of reactivity beginning with the most reactive is.
   A. X>Y>H>Z
   B. Z>X>H>Y
   C. H>X>Y>Z
   D. Y>Z>X>H

6. Which one of the following hydroxide would undergo atmospheric oxidation in the presence of moisture?
   A. $Fe(OH)_2$.
   B. $Fe(OH)_3$.
   C. $Al(OH)_3$.
   D. $Cu(OH)_2$.

7. The diagram below shows the interchange of the three states of matter.




The process labelled P and Q respectively are;
   A. condensation and sublimation.
   B. freezing and evaporation.
   C. sublimation and condensation.
   D. sublimation and melting.

8. Which one of the following compounds contains the highest percentage of sulphur (S = 32, H = 1, O = 16)
   A. $H_2SO_4$.
   B. $H_2S_2O_7$.
   C. $SO_2$.
   D. $H_2S$.

9. Which one of the following reagent can be used to distinguish between zinc ions and aluminium ions.
   A. Lead (II) nitrate solution.
   B. Ammonia solution.
   C. Barium nitrate solution.
   D. Sodium hydroxide solution.

10. $^{79}_{35}Br$ and $^{81}_{35}Br$ are atoms of bromine. the major difference between them is. that they have
   A. different number of electrons.
   B. different number of protons.
   C. different number of neutrons.
   D. different number of energy levels.

11. The molarity of 49.0g of sulphuric acid in 250cm$^3$ solution is
   A. $\frac{98 \times 250}{1000}$
   B. $\frac{49 \times 1000}{98 \times 250}$
   C. $\frac{98 \times 1000}{49 \times 250}$
   D. $\frac{49 \times 250}{98 \times 1000}$

12. Which one of the following oxides shows both basic and acidic properties?
   A. Lead (II) oxide.
   B. Nitrogen (II) oxide.
   C. Phosphoric (V) oxide.
   D. Copper (II) oxide.

13. Which one of the following is/are formed when ammonium nitrate is strongly heated
   A. Nitrogen (I) oxide and water.
   B. Nitrogen (II) oxide and water.
   C. Nitrogen and water.
   D. Nitrogen, Hydrogen and water.

14. When chlorine is bubbled through an aqueous solution of sodium sulphite the product formed is/are
   A. Sodium sulphate.
   B. Sodium hydrogen sulphate.
   C. Sodium sulphate and hydrochloric acid.
   D. Sodium hydrogen sulphate and water.

15. Steel is an alloy of iron and
   A. Tin.
   B. Copper.
   C. Zinc.
   D. Carbon.

16. Which one of the following metals is not commonly used for electroplating?
A. Chromium.
B. Tin.
C. Copper.
D. Iron.

17. What mass in grammes of sodium carbonate-10-water is contained in $50cm^3$ of 0.1M solution (H = 1, C = 12, O = 16, Na = 23)
A. $\frac{106 \times 0.1 \times 1000}{50} g.$
B. $\frac{106 \times 0.1 \times 50}{1000} g.$
C. $\frac{286 \times 0.1 \times 1000}{50} g.$
D. $\frac{50 \times 0.1 \times 286}{1000} g.$

18. The electronic configuration of atom of element G is 2:8:1. Which one of the following elements will show properties similar to G.
A. $^{28}_{14}Q.$
B. $^{27}_{13}R.$
C. $^{39}_{13}W.$
D. $^{40}_{19}T.$

19. The statement which is not true about sulphur dioxide is…
A. turns wet blue litmus red.
B. turns lime water milky.
C. forms sulphite with sodium hydroxide solution.
D. fumes with hydrogen chloride.

20. Which one of the following adopts a giant atomic structure?
A. NaCl
B. $CO_2$
C. $SiO_2$
D. $Al_2O_3$

21. Which of the following salts would form an alkaline solution when dissolved in water?
A. Sodium carbonate.
B. Sodium chloride.
C. Ammonium chloride.
D. sodium sulphate.

22. Which one of the following is observed when copper (II) sulphate solution is electrolyzed using copper electrodes?
A. Bubbles of colorless gas.
B. Decrease in size of the cathode.
C. Decrease in the size of the anode.
D. the anode is coated with copper metal.

23. It's possible to collect hydrogen gas by upwards delivery because;
A. its soluble in water.
B. it burns with pop sound.
C. it's a colourless gas.
D. its less dense than air.

Magnesium burns in oxygen according to the equation

$2Mg(s) + O_2(g) \longrightarrow 2MgO(s)$

The mass of magnesium oxide formed when 7.2g of magnesium burns completely in excess oxygen is (O = 1 , Mg = 24)

A. $\frac{7.2 \times 40}{24}$

B. $\frac{24 \times 40}{7.2}$

C. $7.2 \times 24 \times 40$

D. $\frac{7.2 \times 24}{40}$

25. During preparation of sulphur dioxide from sodium sulphite and dilute hydrochloric acid, heating is necessary in order to;

A. speed up the rate of the reaction.
B. dry up the gas.
C. evaporate the sulphur dioxide.
D. prevent the gas from dissolving in water.

26. When a solution containing 4g of sodium hydroxide was completely reacted with hydrochloric acid, 2730 joules of heat was evolved. Which one of the following is the heat of neutralization of sodium hydroxide by hydrochloric acid (NaOH = 40).

A. $\frac{2730 \times 4}{100 \times 40}$ $KJmol^{-1}$

B. $\frac{1000 \times 40}{4 \times 2730}$ $KJmol^{-1}$

C. $\frac{4 \times 2730 \times 1000}{40}$ $KJmol^{-1}$

D. $\frac{40 \times 2730}{1000 \times 4}$ $KJmol^{-1}$

27. $45cm^3$ of hydrogen gas were exploded with $30cm^3$ of nitrogen gas at room temperature. The gaseous product which remained when the reaction had come to an end is

A. $15cm^3$ of hydrogen and $20cm^3$ of nitrogen gas.
B. $15cm^3$ of hydrogen gas.
C. $20cm^3$ of ammonia gas.
D. $45cm^3$ of ammonia gas.

28. Which of the following is a synthetic polymer?

A. Nylon.
B. Wool.
C. Sisal.
D. Cotton.

29. A white precipitate is formed when lead (II) nitrate solution is added to an aqueous solution of Z. the precipitate decomposed when heated. The anion in Z is likely to be.

A. $SO_4^{2-}$.
B. $Cl^-$.
C. $CO_3^{2-}$.
D. $HCO_3^-$.

30. Element, Q was burnt in excess oxygen gas. The resultant solid product was dissolved in water containing litmus paper. The litmus turned pink. The solid product is likely to be
A. sodium oxide.
B. phosphorous (V) oxide.
C. calcium oxide.
D. Sulphur (IV) oxide.

31. Which one of the following explains the bleaching action of sulphurous acid.
A. Gives oxygen to the dye.
B. Neutralizes the dye.
C. Extracts oxygen from the dye.
D. Gives away its replaceable hydrogen to the dye.

32. Which one of the following is formed when excess ammonia gas reacts with chlorine gas?
A. $NH_4Cl$ and $N_2$.
B. $NCl_3$ and $N_2$.
C. $NCl_3$ and HCl.
D. $NH_4Cl$ and HCl.

33. The white precipitate formed when silver nitrate solution is added to sodium chloride solution dissolves in ammonia solution because;
A. ammonia solution is a weak alkali.
B. silver ions forms a complex with ammonia molecules.
C. silver chloride easily decomposes.
D. the ammonia molecules are more volatile.

34. Which of the following is **NOT** used during the manufacture of cast iron?
A. Hematite.
B. graphite.
C. calcium carbonate.
D. Hot air.

35. Metal P displaces hydrogen from dilute acids but metal Q does not. Metal R displaces P from its chloride. The order of reactivity of the metals beginning with the most reactive is.
A. P , Q , R.
B. Q , P , R.
C. R , Q , R.
D. R , P , Q.

36. Which one of the following compounds will turn purple acidified potassium permanganate solution colourless when bubbled through it?
A. $C_2H_4$.
B. $CH_4$.
C. $C_4H_{10}$.
D. $C_2H_6$.

37. When acidified lead (II) nitrate solution is added to an aqueous solution X, A white precipitate is formed. X is likely to contain both;
A. $HCO_3^-$ and $Cl^-$
B. $SO_4^{2-}$ and $HCO_3^-$
C. $Cl^-$ and $CO_3^{2-}$
D. $SO_4^{2-}$ and $Cl^-$

38. The dehydration reactions of sulphuric acid are shown in its reaction with the following except:

A. $C_2H_5OH$
B. $C_6H_{12}O_6$
C. $CuSO_45H_2O$
D. $NaNO_3$

39. Which of the following processes will absorb at least two gases from the atmosphere?

A. Combustion of Magnesium.
B. Respiration.
C. Fermentation of sugars.
D. Photosynthesis.

40. Calcium carbide reacts with water to produce a gas according to the equation.

$CaC_{2(s)} + 2H_2O_{(l)} \longrightarrow Ca(OH)_{2\,(s)} + C_2H_{2\,(g)}$

The volume of the gaseous product at stp when 6.4g of calcium carbide reacts completely is; (ca = 40, C = 12, H = 1)

A. $\frac{6.4 \times 64}{22.4}$
B. $\frac{22.4}{64 \times 64}$
C. $64 \times 6.4 \times 22.4$
D. $\frac{6.4 \times 22.4}{64}$

***Each of the following questions 41 – 45 consists of an assertion (statement) on the left hand side and a reason on the right hand side.***

**Select as follows.**

**A.** If both assertion and reason are **true** statements and the reason is the **correct** explanation of the assertion.
**B.** If both assertion and reason are **true** statements but the reason is **not** the 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 Summarised**

| 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. Water gas is a better fuel than produced gas **because** all its components are combustible

42. Nitrogen is chemically an Inert gas **because** nitrogen is a diatomic molecule

| | | | | |
|---|---|---|---|---|
| 43. | Chlorine occurs in combination With other elements as in Sodium chloride | because | it is a diatomic molecule in its elemental state. | |
| 44. | Graphite and diamond are Isotopes of carbon | because | the two have different structures. | |
| 45. | An atom is electrically neutral | because | protons are positively charged while electrons are negatively charged. | |

***In each of the question 46 – 50 one or more of the answers may be correct. Read each question carefully and then indicate the correct answer as: A, B, C or D 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.

**Instructions Summarised.**

| A | B | C | D |
|---|---|---|---|
| 1, 2, 3 only | 1 and 3 only | 2 and 4 only | 4 only |

46. Decomposition of chlorine water in the presence of sun light form(s);
1. $Cl_2$
2. HCl
3. $HClO_4$
4. $O_2$

47. Which one of the following reactions is/are **NOT** involved in the catalytic oxidation of ammonia?
1. $4NO_{2(g)} + 2H_2O_{(g)} + O_{2(g)} \longrightarrow 4HNO_{3(aq)}$.
2. $2NO_{(g)} + O_{2(g)} \longrightarrow 2NO_{2(g)}$.
3. $4NH_{3(g)} + 5O_{2(g)} \longrightarrow 4NO_{(g)} + 6H_2O_{(g)}$.
4. $2HNO_{3(aq)} + SO_{2(g)} \longrightarrow H_2SO_{4(aq)} + 2NO_{2(g)}$.

48. The form(s) of amorphous carbon used as fuel(s) is/are
1. Coal.
2. Animal charcoal.
3. Coke.
4 Soot.

49. Which of the following decomposes when heated to produce a mixture of gases?
1. $KNO_3$.
2. $HNO_3$.
3. $ZnCO_3$.
4. $Ag_2CO_3$.

50. Which of the following process(s) requires Hydrogen?
1. Haber process.
2. Contact process.
3. Hardening of oils.
4. Polymerisation.

**END**

Name..... Signature.....

School..... Index No.....

**545/1**
**CHEMISTRY**
**Paper 1**
**July/August 2013**
1 ½ hours

# WAKISSHA JOINT MOCK EXAMINATIONS

## Uganda Certificate of Education

## CHEMISTRY

## Paper 1

1 hour 30 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 ability of liquids and gas to flow depends on
   A. High intermolecular forces
   B. Low intermolecular forces
   C. High kinetic energy
   D. Low kinetic energy

2. Which of the following in a neutral oxide?
   A. $Fe_3O_4$
   B. $Fe_2O_3$
   C. NO
   D. $N_2O_4$

3. The element most likely to remove oxygen from Zinc oxide when a mixture of the oxide and element is heated is
   A. Lead
   B. Magnesium
   C. Copper
   D. Iron

4. Which of the following anions forms a white precipitate with barium nitrate solution soluble in nitric acid
   A. $SO_4^{2-}$
   B. $CO_3^{2-}$
   C. $Cl^-$
   D. $NO_3^-$

5. Atomic number of an element R is 13, the electronic configuration of the ion of R is
   A. 2 : 8 : 8
   B. 2 : 8 : 5
   C. 2 : 8 : 3
   D. 2 : 8

6. The reaction between two substances is exothermic. Which of the following is mostly likely to slow down the rate of reaction.
   A. Increasing the temperature of the surrounding
   B. Placing the reagent in an ice bath
   C. Having an excess of one of the reagents
   D. Removing the products as fast as they are formed.

7. Carbon dioxide gas shows the following properties. It is
   i) denser than air
   ii) a sublimate
   iii) non – combustible
   iv) does not support combustion

   The use of carbon dioxide as a coolant depends on
   A. (i) and (ii)
   B. (ii) and (iii)
   C. (iii) and (iv)
   D. (ii) only

8. 75g of a saturated solution contained 30g of a salt. What is the solubility of the salt?
   A. 40g/ 100g of water
   B. 66.67g/ 100g of water
   C. 6.67g/ 100g of water
   D. 250g/ 100g of water

9. In which of the following reactions is chlorine acting as an acidic gas
   A. $2Fe_{(s)} + 3Cl_{2(g)} \longrightarrow 2FeCl_{3(s)}$
   B. $2Na_{(s)} + Cl_{2(g)} \longrightarrow 2NaCl_{(s)}$
   C. $Cl_{2(g)} + NaOH_{(aq)} \longrightarrow NaOCl_{(aq)} + NaCl_{(aq)} + H_2O(l)$
   D. $H_{2(g)} + Cl_{2(g)} \longrightarrow 2HCl_{(g)}$

10. Which of the following substance sublimes when heated
   A. Hydrated sodium carbonate
   B. Ammonium chloride
   C. Copper II oxide
   D. Ammonium sulphate

11. The elements that can be extracted from their oxides by chemical reduction using carbon (coke) are
   A. Al and Zn
   B. Zn and Fe
   C. Mg and Cu
   D. Ca and Cu

12. The atomic numbers of elements X, Y, W and Z are 9, 11, 16 and 12 respectively. Which one of the following pairs of elements will form a covalent compound.
   A. X and W
   B. X and Y
   C. W and Z
   D. Y and W

13. Which one of the following hydroxides is soluble in excess aqueous ammonia solution **but** insoluble in excess sodium hydroxide solution.
   A. $Fe(OH)_2$
   B. $Pb(OH)_2$
   C. $Cu(OH)_2$
   D. $Ca(OH)_2$

14. Which of the following processes is **not** used to remove permanent hardness in water
   A. Treatment with sodium carbonate
   B. Distillation
   C. Ion exchange
   D. Addition of calcium hydroxide

15. An element A forms a covalent compound with oxygen of formula $A_2O_3$. Given that A belongs to period 3 of the periodic table, the possible electronic configuration of the atom of A is
   A. 2 : 8 : 5
   B. 2 : 8 : 7
   C. 2 : 8 : 3
   D. 2 : 8 : 6

16. Graphite is used as an electrode in electrolysis because it
   A. is soft and slippery
   B. has hexagonal layers
   C. has mobile electrons
   D. is black and translucent

17. Which of the following is strong acid
   A. Citric acid
   B. Phosphoric acid
   C. Carbonic acid
   D. Hydrochloric acid



Turn Over

18. $20cm^3$ of 0.1M sodium carbonate solution reacted completely with $10cm^3$ of dilute hydrochloric acid according to the equation below

$Na_2CO_{3(aq)} + 2HCl_{(aq)} \longrightarrow 2NaCl_{(aq)} + H_2O_{(l)} + CO_{2(g)}$

The molarity of the acid is

A. 0.1 M
B. 0.4 M
C. 0.8 M
D. 0.2 M

19. Which of the following catalysts is used in the manufacture of sulphuric acid by contact process

A. Manganese (IV) oxide
B. Finely divided iron
C. Vanadium (V) oxide
D. Platinised absestos

20. Which one of the following would dissolve in dilute hydrochloric acid?

A. Lead (II) sulphate
B. Lead (II) chloride
C. Barium sulphite
D. Barium sulphate

21. Nitrogen reacts with hydrogen according to the equation

$N_{2(g)} + 3H_{2(g)} \leftrightarrows 2NH_{3(g)}$

The total volume of gaseous products formed at the end of the reaction when $120cm^3$ of hydrogen were mixed with $50cm^3$ of nitrogen is

A. $170cm^3$
B. $90cm^3$
C. $80cm^3$
D. $70cm^3$

22. Which one of the following reagents can be used to oxidise Iron (II) ions to Iron (III) ions.

A. Sulphur dioxide
B. Hydrogen sulphide
C. Chlorine
D. Hydrogen chloride

23. The number of protons, neutrons, and electrons in an atom Z represented by $^{213}_{84}z$ respectively is

A. 129 213 84
B. 84 129 213
C. 84 129 129
D. 84 129 84

24. When 4.0 g of an oxide of the element X were reduced, 3.2g of Z were obtained. The simplest formula of the oxide of X is;

[X = 64 , O =16]

A. XO
B. $X_2O$
C. $XO_2$
D. $X_2O_3$

25. A solid M dissolves in water to form a colourless gas that fumes with hydrogen chloride gas. The solid M is likely to be

A. $Na_2O_2$
B. $Mg_3N_2$
C. $NaNO_3$
D. $Mg(NO_3)_2$

26. Vulcanisation of rubber is aimed at increasing its
A. strength and reactivity
B. stability and viscosity
C. elasticity and reactivity
D. strength and elasticity

27. Which one of the following conducts electricity in electrolytes?
A. Neutrons
B. electrons
C. Protons
D. Ions

28. Glucose burns in oxygen according to the equation below
$C_6H_{12}O_{6(s)} + 6O_{2(g)} \longrightarrow 6CO_{2(g)} + 6H_2O_{(l)}$; $\Delta H = 2802 KJmol^{-1}$
The amount of heat produced when 18.0g of glucose is burnt completely in oxygen at the same temperature is
[H=1, C=12, O=16]
A. $\frac{2802}{18.0 \times 180}$
B. $\frac{180}{2802 \times 18.0}$
C. $\frac{180 \times 18.0}{2802}$
D. $\frac{2802 \times 18.0}{180}$

29. Which of the following pairs of salts can be separated by filtration?
A. Sodium carbonate and Ammonium carbonate
B. Ammonium sulphate and Magnesium Sulphate
C. Barium chloride and Barium nitrate
D. Zinc carbonate and Zinc sulphate

30. The melting and boiling points of substances W, X, Y and Z are summarized below.

| Substance | melting point(°C) | Boiling point(°C) |
|---|---|---|
| W | -135 | -0.5 |
| X | -38.9 | 356.6 |
| Y | -145 | -10 |
| Z | -112 | 75.5 |

Which of the following pairs of substances are liquids at room temperature
A. W and X
B. X and Y
C. X and Z
D. Y and Z

31. Which one of the following gases diffuses fastest under similar conditions of temperature and pressure?
C=12, O =16, Cl =35.5, N =14, H =1
A. $NH_3$
B. CO
C. $SO_2$
D. $Cl_2$

32. _____ is a process by which starch is formed from glucose molecules.
A. Neutralization
B. Polymerisation
C. Hydrolysis
D. Fermentation

33. Which of the following hydrocarbons decolourises bromine water when bubbled through it?
A. Ethene
B. Ethane
C. Butane
D. Methane

34. Sodium nitrate decomposes according to the following equation.
$2NaNO_{3(s)} \longrightarrow 2NaNO_{2(s)} + O_{2(g)}$
The volume of oxygen at s.t.p produced when 10g of sodium nitrate are decomposed is, (1 mole gas volume at s.t.p 22.4dm$^3$, Na=23, N=14, O=16)
A. $\frac{10 \times 22.4}{170}$
B. $\frac{10 \times 170}{22.4}$
C. $\frac{22.4 \times 10}{85}$
D. $\frac{10 \times 85}{22.4}$

35. 0.98g of a gas M at s.t.p occupies 8.4dm$^3$. The relative molecular mass of gas M is (1 mole of gas occupies 22.4dm$^3$ at s.t.p)
A. $\frac{0.98 \times 22.4}{8.4}$
B. $\frac{0.93 \times 8.4}{22.4}$
C. $\frac{22.4 \times 8.4}{0.98}$
D. $\frac{0.98}{22.4 \times 8.4}$

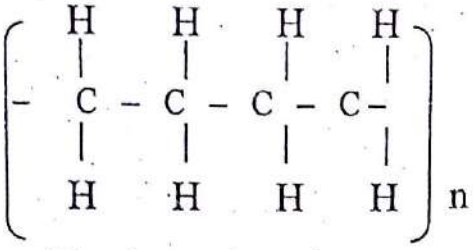
36. Which one of the following anions when in solution will react with lead (II) nitrate to form a white precipitate which dissolves on heating and reappears on cooling?
A. Iodide ion
B. Chlorine ion
C. Sulphate ion
D. Carbonate ion

37. Which of the following salts does NOT produce Ammonia gas when heated?
A. Ammonium carbonate
B. Ammonium chloride
C. Ammonium sulphate
D. Ammonium nitrate

38. Which of the following is observed when solid lead(II) nitrate is heated strongly?
A. White residue
B. A residue which is reddish brown when hot and yellow on cooling
C. A residue which is yellow when hot and white on cooling
D. A grey residue

39. What mass of sodium hydroxide would be needed to neutralize exactly 200cm$^3$ of a solution containing 49g of sulphuric acid per litre?
$2NaOH_{(aq)} + H_2SO_{4(aq)} \longrightarrow Na_2SO_{4(aq)} + 2\ H_2O_{(l)}$ (Na=23, O=16, H=1 and S = 32)
A. 4g
B. 8g
C. 16g
D. 32g

40. The structure below is of a polymer



the name of the monomer of the above polymer is

A. Ethene
B. Ethane
C. Butane
D. Butene

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

**Instructions summerised**

| A | B | C | D |
|---|---|---|---|
| 1, 2, 3 are collect | 1,3 are correct | 2,4 are correct | 4 only is correct |

41. Which of the following element(s) reacts directly with oxygen to form an oxide?
1. Magnesium
2. Silver
3. Copper
4. Gold

42. When dry hydrogen gas is passed over heated copper (II) oxide,
1. Copper (II) oxide is reduced
2. Hydrogen is reduced
3. Hydrogen is oxidized
4. Copper is oxidized

43. The salts that can be prepared by precipitation is/ are
1. Lead (II) nitrate
2. Lead (II) sulphate
3. Barium nitrate
4. Barium sulphate

44. Which of the following contains the same number of particles as $2.4dm^3$ of Argon at room temperature
[Mg = 24, Ca = 40, C =12, O = 16, Al = 27], molar gas volume $= 24dm^3$ at room temperature.
1. 2.4g of magnesium
2. 4.0g of calcium
3. 4.4g of carbon dioxide
4. 3.4g of Aluminium

45. Carbon and phosphorous are similar in that both
    1. Are non – metallic elements
    2. Exist in allotropic forms
    3. Form covalent oxides
    4. Form neutral oxides

**Each of questions 46 – 50 consist 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 correct explanation.**

**B. If both the assertion and the reason are true statements but 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 a correct statement but the reason is a correct statement.**

**Instruction 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 |

| | | | | |
|---|---|---|---|---|
| 46. | Hydrogen gas can be collected by upward delivery | Because | it can easily explode when mixed with air. | |
| 47. | The reactivity of alkali metals decreases down the group | Because | the atomic radius of the alkali metals increases down the group. | |
| 48. | Hydrogen chloride gas can be used instead of ammonia gas in fountain experiment | Because | hydrogen chloride gas and Ammonia gas have same solubilities in water. | |
| 49. | Concentrated sulphuric acid is a strong oxidizing agent. | Because | it ionizes completely to produce $H^+$ in solution. | |
| 50. | In electrolysis of dilute sulphuric acid, hydroxyl ions are discharged in preference to sulphate ions. | Because | sulphate ions carry more charge than hydroxyl ions. | |

**END**

Name ..... Signature .....

School ..... .....Index No .....

545/1
CHEMISTRY
Paper 1
July/August -2011
1 ½ hours

# WAKISSHA JOINT MOCK EXAMINATIONS

## Uganda Certificate of Education

## CHEMISTRY
## Paper 1

**1 hour 30 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 |
| --- |
| |



**Turn Over**

1. Metal Z reacts with cold water while Y reacts with steam. X reacts with an aqueous solution of Y according to the equation: $X(s) + Y^{2+}(aq) \longrightarrow X^{2+}(aq) + Y(s)$
The order of reactivity of the metals starting with the most reactive is

A Z, Y, X
B. X, Y, Z
C. X, Z, Y
D. Y, X, Z

2. Which one of the following statements is true about mixtures separated by fractional distillation?

A. The components are miscible.
B. The components have close boiling points.
C. The components are immiscible.
B. The components have different rates of movement.

3. Which one of the following pairs of electrolytes whose formulae are given conduct electricity in the molten state?

A. $CuSO_4$ and NaOH
B. $Pb(NO_3)_2$ and $ZnCl_2$
C. NaOH and NaCl
D. $PbBr_2$ and $PbCl_2$

4. The formula of an ion of element Z is $Z^{2+}$. The likely structure of an atom of element Z is

A. $^{27}_{13}Z$

B. $^{23}_{11}Z$

C. $^{24}_{12}Z$

D. $^{15}_{7}Z$

5. The number of moles of ammonium ions in 50 $cm^3$ of a 0.2 M ammonium sulphate solution is...

A. $\frac{0.2 \times 50 \times 2}{1000}$

B. $\frac{0.2 \times 50}{1000}$

C. $0.2 \times 50 \times 2$

D. $\frac{0.2 \times 50}{2 \times 1000}$

6. Which one of the following pairs of salts whose formulae are given can be prepared by the same method?

A. $ZnSO_4.7H_2O$ and $CuSO_4.5H_2O$
B. $ZnSO_4.7H_2O$ and $FeSO_4.7H_2O$
C. $ZnSO_4.7H_2O$ and $PbSO_4$
D. $FeSO_4.7H_2O$ and $PbSO_4$

7. The reaction below in which sulphuric acid acts as a dehydrating agent is...

A. $Mg(s) + H_2SO_4(aq) \longrightarrow MgSO_4(aq) + H_2(g)$
B. $S(s) + 2H_2SO_4(l) \longrightarrow 3SO_2(g) + 2H_2O(l)$
C. $C_2H_5OH(l)$ $H_2SO_4(l) \longrightarrow C_2H_4(g) + H_2O(l)$
D. $C(s) + 2H_2SO_4(l) \longrightarrow CO_{2(g)} + 2SO_2(g) + 2H_2O(l)$

8. Which one of the following is a pair of saturated hydrocarbons?

A. $C_4H_{10}$ and $C_2H_4$
B. $C_2H_6$ and $C_3H_8$
C. $C_2H_6$ and $C_2H_4$
D. $C_3H_8$ and $C_2H_4$

9. When water is added to solid M, a colourless gas which relights a glowing splint is evolved. M is likely to be

A. $Na_2O_2$
B. $KClO_3$
C. $Na_2CO_3$
D. $H_2O_2$

10. Methane burns in Oxygen according to the equation:
$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$ $\Delta H = -890$ kJ mol$^{-1}$. The volume of methane measured at room temperature that burns in excess oxygen to evolve 890 J of heat is [Molar gas volume at room temperature = 24 dm$^3$]

A. 24 cm$^3$
B. 24000 cm$^3$
C. 240 cm$^3$
D. 2.40 cm$^3$

11. When lead(II) nitrate solution is added to an aqueous solution X, a white precipitate is formed. X is likely to contain...

A. $I^-$, $SO_4^{2-}$, $Cl^-$
B. $CO_3^{2-}$, $I^-$, $OH^-$
C. $\overline{O}H$, $Cl^-$, $I^-$
D. $SO_4^{2-}$, $CO_3^{2-}$, $Cl^-$

12. The pair of substances below which dissolves in water to form a solution with pH less than 7 is…

A. $Na_2O$ and $CO_2$
B. $CO_2$ and $SO_2$
C. CaO and $SO_2$
D. $CO_2$ and CaO

13. Which one of the following acids reacts with copper metal evolving reddish brown fumes?

A. $H_2CO_3$
B. $HNO_3$
C. $H_2SO_4$
D. HCl

14. Which one of the following forms of Carbon consists of hexagonal crystals?

A. Graphite
B. Diamond
C. Soot
D. Lampblack

15. A hydrocarbon S of molecular mass 58 contains 82.76% by mass of carbon. The molecular formula of is….

A. $C_4H_8$
B. $C_4H_{10}$
C. $C_2H_5$
D. $C_4H_6$

16. 10 $cm^3$ of hydrogen was mixed with 10 $cm^3$ of oxygen and the mixture exploded. The mixture was allowed to cool to room temperature. The Volume of gas that remained was…

A. 10 $cm^3$ of steam
B. 15 $cm^3$ of steam and oxygen
C. 5 $cm^3$ of hydrogen
D. 5 $cm^3$ of oxygen

17. 25.0 $cm^3$ of a 0.1M solution of substance Z required 24.9 $cm^3$ of a 0.2 M solution of an acid. The ratio in which Z reacts with the acid is

A. 2:1
B. 1:2
C. 1:1
D. 2:3

18. When gas X is passed over heated iron, a white solid is formed. X is likely to be…

A. chlorine
B. hydrogen
C. hydrogen chloride
D. sulphur dioxide

19. The order of reactivity of metal X, Y and Z is X, Y, Z. Which one of the following statements is true about the metals?

A. When Z is added to an aqueous solution of X a precipitate is formed.
B. When X is added to an aqueous solution of Z a precipitate is formed.
C. $Y(s) + X^{2+}(aq) \longrightarrow Y^{2+}(aq) + X(s)$
D. Z reacts with cold water while X and Y react with steam.

20. When blue litmus paper is dipped into an aqueous solution X, the blue litmus turns red. X is likely to contain...

A. $NH_4^+$
B. $Mg^{2+}$
C. $Ca^{2+}$
D. $OH^-$

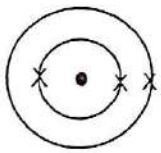
21. When heated potassium hydrogen carbonate decomposes according to the equation.

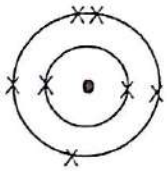
$2KHCO_3(s) \longrightarrow K_2CO_3(s) + CO_2(g)$

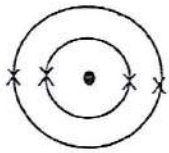
Determine the loss in mass of Potassium hydrogen carbonate when 5g of it is heat.
(K = 39, H = 1, C = 12, O = 16)

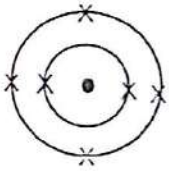
A. 1.1 g
B. 2.2 g
C. 3.45 g
D. 11.0 g

22. The formula of a sulphate of element M is $MSO_4$. The electronic structure of an atom of an element that belongs to the same group with M is

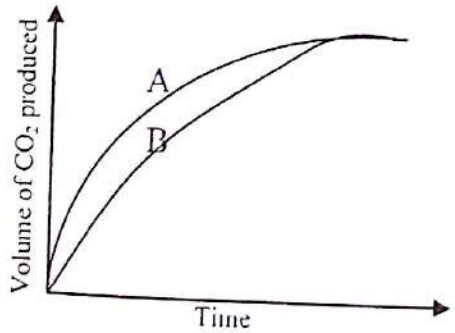
A. 

B. 

C. 

D. 

23. The variation of volume of carbon dioxide produced with time when calcium carbonate is reacted with hydrochloric acid is shown in the figure below.



Curve A is obtained when

A. bigger chips of calcium carbonate are used.
B. the volume of acid is increased.
C. the concentration of the acid is increased.
D. the temperature is lowered.

24. The number of particles in the atoms of elements P Q R and S are

| Atom | Protons | Neutrons | Electrons |
|---|---|---|---|
| P | 6 | 6 | 6 |
| Q | 2 | 2 | 2 |
| R | 4 | 5 | 4 |
| S | 6 | 7 | 6 |

Which of the atoms are isotopes?

A. P and R
B. R and S
C. P and Q
D. P and S

25. Which one of the following gas diffuses faster than dinitrogen oxide?
(N = 14, O = 16, C = 12 H = 1 S = 32)

A. Butane
B. Ethene
C. Sulphur dioxide
D. Propane

26. The volume of oxygen produced when hydrogen peroxide decomposes is increased by

A. increasing the volume of hydrogen peroxide
B. adding manganes(IV) oxide
C. adding copper(II) sulphate
D. mixing with vanadium(V) oxide

27. What mass of copper(II) sulphate -5- water is required to make 100 $cm^3$ of 0.1M solution?
[Cu = 64, S = 32, O = 16, H = 1]

A. $5 \times 100 \times 0.1$
B. $\frac{1000 \times 250 \times 0.1}{100}$
C. $\frac{250 \times 100}{1000}$
D. $\frac{0.1 \times 250 \times 100}{1000}$

28. A mixture of ammonia and oxygen was passed over heated platinum wire. The product(s) of the reaction is/are…

A. Nitrogen monoxide
B. Dinitrogen oxide
C. Nitrogen dioxide
D. Nitrogen monoxide and water

29. Which one of the following is observed when concentrated copper(II) chloride is electrolyzed using copper electrodes?

A. A colourless gas at the anode.
B. A yellowish-green gas at the cathode.
C. A yellowish-green gas at the anode.
D. The anode increases in size.

30. The formula of a gas that dissolves in water to form an alkaline solution is...

A. $NH_3$
B. $NO_2$
C. NO
D. $N_2O$

31. 25 $cm^3$ of a 0.1 M solution of acid HA reacted completely with 20 $cm^3$ of sodium hydroxide solution. The molar concentration of sodium hydroxide is...

A. 0.100 M
B. 0.125 M
C. 0.200 M
B. 0.250 M

32. The pair of salts below which forms reddish brown fumes when heated is...

A. $KNO_3$ and $NaNO_3$
B. $KNO_3$ and $Zn(NO_3)_2$
C. $Zn(NO_3)$ and $Cu(NO_3)_2$
D. $Zn(NO_3)_2$ and $ZnCO_3$

33. Which one of the following gases can be prepared from ethanol?

A. Ethane
B. Butane
C. Methane
D. Ethene

34. 10 $cm^3$ of nitrogen were reacted with 40 $cm^3$ of hydrogen. What volume of ammonia was formed? (All gases measured at s.t.p)

A. 30 $cm^3$
B. 50 $cm^3$
C. 20 $cm^3$
D. 40 $cm^3$

35. When 6 g of graphite is burnt in excess oxygen 195kJ of heat energy is evolved. Therefore the molar heat of combustion of graphite is

A. $-\left(6 \times \frac{195}{12}\right)$

B. $-(12 \times 6 \times 195)$

C. $-\left(195 \times \frac{12}{6}\right)$

D. $-(6 \times 195)$

36. The formula of haematite is…

A. $Fe_2O_3$
B. $FeO$
C. $Fe_3O_4$
D. $FeCO_3$

37. 2 litres of gas Z measured at s.t.p weigh 5.71 g. The molar mass of the gas is…
[Molar gas volume = 22400 $cm^3$]

A. 32 g
B. 64 g
C. 6.4 g
D. 3.2 g

38. A white precipitate was formed when a soap solution was added to solution X. X might have contained…

A. $Na^+$ and $K^+$
B. $Mg^{2+}$ and $K^+$
C. $Mg^{2+}$ and $Ca^{2+}$
D. $Mg^{2+}$ and $Zn^{2+}$

39. A white precipitate is formed when lead(II) nitrate solution is added to an aqueous solution of Z. The precipitate decomposes when heated. The anion in Z is likely to be

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

40. Gas X does not burn but forms dense white fumes with ammonia. An aqueous solution of X…

A. has no effect on litmus.
B. is acidic.
C. is alkaline.
D. is neutral.

***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. When hydrogen chloride gas is bubbled into ammonia solution there is no observable change, but when a gas jar of hydrogen chloride gas is inverted over a gas jar of ammonia gas white fumes are formed. **Because** Both hydrogen chloride and ammonia gas are highly soluble gases. [ ]

42. Electrolysis of acidified water evolves hydrogen and oxygen gas. **Because** Water consists of hydrogen and oxygen molecules combined together. [ ]

43. Excessive use of "OMO" affects our Lakes and rivers. **Because** "OMO" easily dissolves in water than ordinary soap. [ ]

44. Reactivity of the alkali earth metals increases as the group is descended **Because** As the group is descended the atoms become bigger. [ ]

45. When ammonia gas is passed over heated copper(II) oxide its mass increases. **Because** Ammonia reduces copper (II) oxide to copper. [ ]

*In each of the questions 46 - 50 one or more of the 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

| Instructions summarized | | | |
|---|---|---|---|
| A | B | C | D |
| 1, 2, 3 only correct | 1, 3 only correct | 2, 4 only correct | 4 only is correct |

46. Which of the following solutions contain the same number of moles of ammonium ions?
1. 50 $cm^3$ of 0.1 M ammonium nitrate
2. 100 $cm^3$ of 0.1 M ammonium chloride
3. 25 $cm^3$ of 0.2 M ammonium sulphate
4. 25 $cm^3$ of 0.2 M ammonium phosphate

47. When ammonia solution is added drop wise until in excess to an aqueous solution X, a precipitate is formed which dissolves in excess ammonia. X is likely to contain…
1. $NH_4NO_3$
2. $Zn(NO_3)_2$
3. $Pb(NO_3)_2$
4. $Cu(NO_3)_2$

48. Which of the following is/are properties of sulphuric acid?
1. Evolves carbon dioxide with bicarbonates
2. Evolves hydrogen when heated with copper metal
3. Turns sugar from white to black
4. When heated with ethanol ethane is formed

49. The ion(s) formed when chlorine is dissolved in a cold sodium hydroxide solution is/ are..
1. $ClO_4^-$
2. $Cl^-$
3. $ClO_3^-$
4. $ClO^-$

50. The structure of substance A is—$(H_2C\text{-}CH_2)_n$—. The gas(es) that react to form A is/are …
1. $C_2H_2$
2. $C_2H_6$
3. $H_2$
4. $C_2H_4$

**END**

Name..... Signature.....

School..... Index No.....

545/1
CHEMISTRY
Paper 1
July/August -2012
1 ½ hours

# WAKISSHA JOINT MOCK EXAMINATIONS

## Uganda Certificate of Education

## CHEMISTRY

## Paper 1

1 hour 30 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* |
| --- |
| |

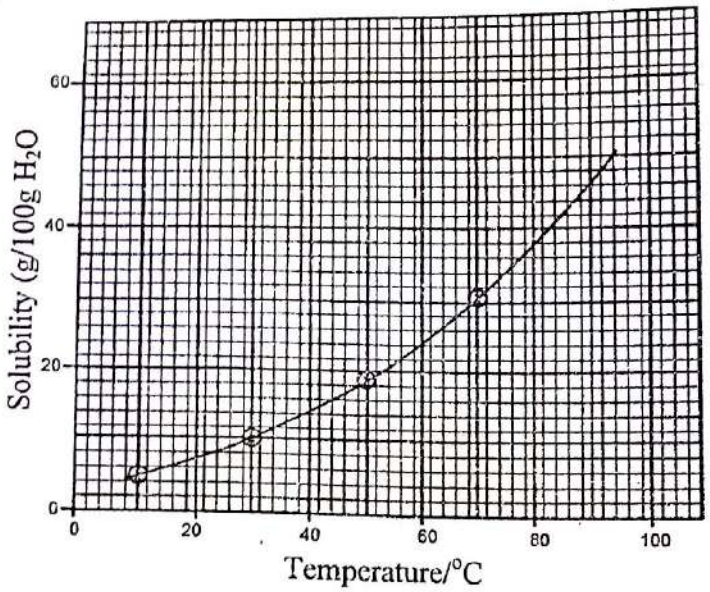


**Turn Over**

1. Which one of the following hydrocarbons whose molecular formulae are given contains a carbon- carbon double bond?

A. $C_2H_6$
B. $C_4H_{10}$
C. $C_3H_8$
D. $C_2H_4$

2. The solubility of salt P varies with temperature according to the graph below.




What mass of P will be precipitated when a saturated solution is cooled from 60°C to 30°C?

A. 10 g
B. 14 g
C. 30 g
D. 25 g

3. The formula of the sulphate of an element Z is $Z_2(SO_4)_3$. The likely atomic structure of Z is

A. $^{27}_{13}Z$
B. $^{24}_{12}Z$
C. $^{35}_{17}Z$
D. $^{23}_{11}Z$

4. Which one of the following gases whose molecular formulae are given can be prepared by dissolving a solid in water?

A. $NO_2$
B. $SO_2$
C. $O_2$
D. $CH_4$

5. 60 $cm^3$ of hydrogen were mixed with 40 $cm^3$ of chlorine and exposed to bright sunlight. The resultant gas mixture was then shaken with water. What was the volume of the residual gas? [$H_2(g) + Cl_2(g) \longrightarrow 2HCl(g)$]

A. 100 $cm^3$
B. 80 $cm^3$
C. 60 $cm^3$
D. 20 $cm^3$

6. The reactivity of the elements X, magnesium and Y is X, Mg, Y. Which one of the following statements is true?

A. When Y is added to a solution of X in water X is precipitated.
B. Magnesium and Y react with cold water.
C. Magnesium and Y react with steam.
D. X and magnesium react with steam.

7. The atomic structure of element M is $^{24}_{12}M$. Which one of the following statement is true about an atom N below M in the Periodic Table?

A. Forms a chloride of the formula NCl
B. Forms a sulphate of the form $N_2(SO_4)_3$
C. Forms a sulphate of the form $NSO_4$
D. Forms a cation of the type $N^{3+}$

8. Which one of the following mixtures can be separated by applying heat to the mixture?

A. Sugar and sand.
B. Iron(III) chloride and sand.
C. Sulpur and iron filings
D. Sodium chloride and sodium sulphate.

9. The number of moles of sulphate ions contained in 25 $cm^3$ of 0.1 M aluminium sulphate solution is.

A. $\frac{25 \times 0.1}{1000}$
B. $\frac{2 \times 25 \times 0.1}{1000}$
C. $\frac{3 \times 25 \times 0.1}{1000}$
D. $\frac{25 \times 0.1}{3 \times 1000}$

10. Concentrated sulphuric acid acts as a dehydrating agent when it reacts with
A. Copper(II) sulphate crystals
B. Sodium hydroxide
C. Magnesium metal
D. Zinc oxide.

11. When 1.2 g of graphite was completely burnt in oxygen, the heat evolved raised the temperature of 100 g of water from 25°C to 35°C. The molar heat of combustion of graphite in joules is [The specific heat capacity of water = 4.2 $Jg^{-1}K^{-1}$, C= 12]

A. $\frac{100 \times 4.2 \times 10 \times 12}{2 \times 1.2}$
C. $\frac{100 \times 4.2 \times 10 \times 12}{1.2}$
B. $\frac{100 \times 4.2 \times 35 \times 12}{1.2}$
D. $\frac{100 \times 4.2 \times 25 \times 12}{1.2}$

12. Which one of the following hydroxides readily reacts with air?

A. $Cu(OH)_2$
B. $Fe(OH)_2$
C. $MgO$
D. $CaO$

13. Dilute sodium hydroxide was electrolyzed using graphite electrodes. The product formed at the positive electrode was

A. Sodium
B. Hydrogen
C. Oxygen
D. Oxygen and hydrogen

14. Which one of the following conditions would result into a high yield of sulphur trioxide in the reaction: $[2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) \quad \Delta H = 190\ kJmol^{-1}]$

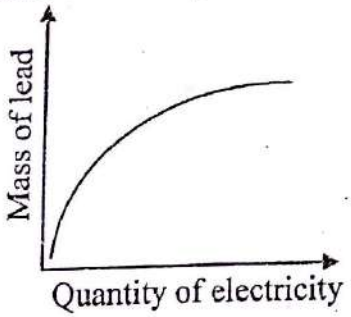
A. Low temperature and low pressure
B. High temperature and high pressure
C. High temperature and low pressure.
D. Low temperature and high pressure

5. A colourless gas when bubbled into potassium dichromate(VI) solution turns it green. The gas is likely to be

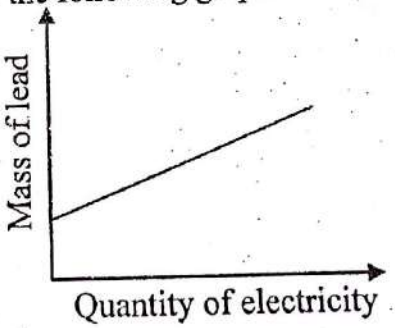
A. Ammonia
B. Hydrogen chloride.
C. Sulphur dioxide
D. Chlorine

. The variation of mass of lead deposited with quality of electricity passed when lead bromide is electrolyzed is described by which one of the following graphs?

A.




B.

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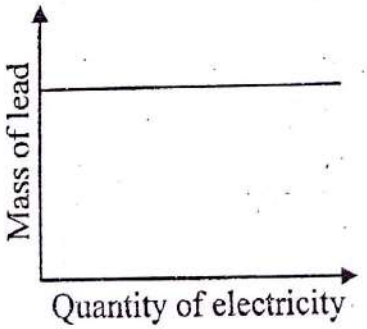


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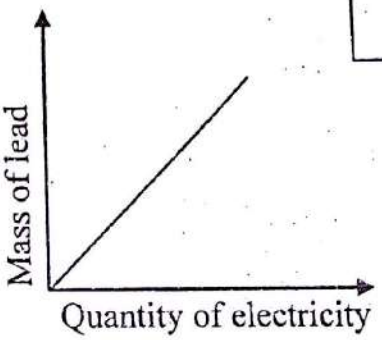


17. Which one of the following gases can be converted into a high molecular mass substance?

A. Ethane
B. Ethene
C. Methane
D. Propane.

18. When sodium hydroxide solution was added to an aqueous solution X, a white precipitate soluble in excess sodium hydroxide was formed. When ammonia solution was added, there was no observable change. The likely cations in X are

A. $Ca^{2+}$, $Ba^{2+}$, $Al^{3+}$
B. $Al^{3+}$, $Pb^{2+}$. $Zn^{2+}$
C. $Al^{3+}$, $Pb^{2+}$
D. $Mg^{2+}$, $Al^{3+}$, $Pb^{2+}$

19. Which one of the following salts whose formulae are given can be prepared by adding dilute sulphuric acid to a solution containing cations of the salt?

A. $MgSO_4$
B. $BaSO_4$
C. $Na_2SO_4$
D. $CaSO_4$

20. What volume of oxygen measured at s.t.p is evolved when water is added to 7.8 g of sodium peroxide? [1 mole of a gas occupies 22400 $cm^3$ Na = 23, O = 16]

A. 2.24 $dm^3$
B. 4.48 $dm^3$
C. 1.12 $dm^3$
D. 6.72 $dm^3$

21. Which one of the following substances dissolves in water to form a solution with pH above 7?

A. Sodium chloride
B. Sodium nitrate
C. Sodium sulphate
D. Sodium peroxide

22. A mixture of solid Z and concentrated sulphuric acid evolved a colourless gas which fumed in moist air. Z is likely to be

A. Carbonate
B. Sulphate
C. Sulphite
D. Chloride

23. What volume of 0.1M potassium iodide will precipitate 4.62 g of lead iodide when added to lead nitrate solution? [Pb = 208, I = 127, $Pb(NO_3)(aq)+2KI(aq) \longrightarrow PbI_2(s)+ 2KNO_3(aq)$]

A. 150 $cm^3$
B. 100 $cm^3$
C. 200 $cm^3$
D. 50 $cm^3$

24. When a mixture of sodium hydroxide and solution X is warmed, a colour gas is evolved. X contains

A. $NH_4^+$
B. $Al^{3+}$
C. $Zn^{2+}$
D. $Pb^{2+}$

25. Which one of the following is utilized when separating a mixture of sodium carbonate and sodium hydrogen carbonate?

A. Difference in boiling points.
B. Difference in solubility.
C. Difference in molecular mass.
D. Difference in melting point.

26. Atoms of the same element with the same atomic numbers but different atomic masses are called

A. Monomers
B. Isomers
C. Allotropes
D. Isotopes

27. An oxide of element Z contains 27.6% oxygen. The simplest ratio of Z to oxygen in the oxide is [Z = 56, O = 16]

A. 2:3
B. 1:2
C. 3:4
D. 1:1

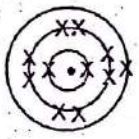
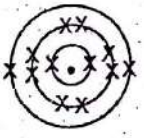
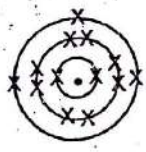
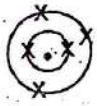
28. Sulphur was burnt in excess oxygen and the product dissolved in water. Which one of the following statements is true about the resultant solution?

A. Turns red litmus blue.
B. Evolves hydrogen when reacted with a metal oxide.
C. Neutral to litmus.
D. Turns blue litmus red.

Which one of the following pairs of substances when heated decomposes forming a residue which dissolves in sodium hydroxide solution?

A. $PbCO_3$ and $Zn(NO_3)_2$
B. $KNO_3$ and $PbCO_3$
C. $NaNO_3$ and $KNO_3$
D. $CuCO_3$ and $CaCO_3$

30. The atomic number of element P is 5. The electronic structure of an element Q which belongs to the same group with P is

A  B.  C.  D. 

31. 20 $cm^3$ of dilute hydrochloric acid reacted completely with 20 $cm^3$ of 0.1M potassium carbonate solution. The molar concentration of hydrochloric acid was
[$K_2CO_3$ (aq) +2HCl (aq) $\longrightarrow$ 2KCl (aq) + $H_2O$(l) + $CO_2$ (g)]

A. 0.1
B. 0.2
C. 0.3
D. 0.4

32. Hydrogen burns in oxygen according to the equation: $H_2(g) + O_2(g) \longrightarrow 2H_2O(l)$ $\Delta H = -286$ kJmol$^{-1}$. What volume of hydrogen measured at room temperature will burn in oxygen to evolve 2.86 x$10^3$ J of heat. [Molar gas volume at room temperature = 24000 $cm^3$]

A. 480 $cm^3$
B 80 $cm^3$
C. 240 $cm^3$
D. 120 $cm^3$

33. Iron filings were left outside for some days. The formula of the product formed was

A. $Fe(OH)_3$
B. $Fe_2O_3.xH_2O$
C. $FeO.xH_2O$
D. $Fe(OH)_2$

34. Which one of the following acids decomposes when heated?

A. Carbonic acid
B. Nitric acid
C. Hydrochloric acid
D. Sulphuric acid

35. Which one of the following pairs of metals can be extracted by a similar method?

A. Potassium and iron
B. Potassium and copper
C. Potassium and sodium
D. Iron and copper.

36. Chlorine gas was bubbled into water and the mixture exposed to sunlight. The observation made was

A. Bubbles of a colourless gas.
B. A greenish- yellow solution was formed.
C. Bubbles of a colourless gas which fumes in moist air.
D. A solution which turns red litmus blue.

37. Which one of the following oxides is used as a catalyst?

A. Magnesium oxide
B. Calcium oxide
C. Vanadium(V) oxide
D. Sodium oxide

38. Which one of the following pairs of salts whose formulae are given can be prepared by action of an acid on a metal?

A. $ZnSO_4.7H_2O$ and $FeSO_4.7H_2O$
B. $FeSO_4.7H_2O$ and $CuSO_4.5H_2O$
C. NaCl and $PbCl_2$
D. $PbCO_3$ and $ZnCO_3$

39. When gas X is bubbled into silver nitrate solution a white precipitate is formed. Which one of the following statements is true about gas X?

A. Has no effect on litmus.
B. Reacts with iron filings evolving hydrogen.
C. Turns red litmus blue.
D. Reacts with potassium iodide forming a brown precipitate.

40. Which one of the following reactions is a neutralization reaction?

A. $MgO(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2O(l)$
B. $Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$
C. $CuSO_4(aq) + 2NaOH(aq) \longrightarrow Cu(OH)_2(s) + Na_2SO_4(aq)$
D. $H_2(g) + Cl_2(g) \longrightarrow 2HCl(g)$

*In each of the questions 41–45, one or more of the answers given may be correct. Read each question carefully and 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.*

41. Which of the following is / are formed when potassium nitrate is heated?
1. Potassium oxide
2. Potassium nitrite
3. Nitrogen dioxide
4. Oxygen

42. Which of the following anions will be precipitated when barium nitrate is added to a solution containing ions?
1. $SO_4^{2-}$
2. $Cl^-$
3. $CO_3^{2-}$
4. $O^{2-}$

43. Which of the following statement(s) is /are true about covalent compounds?
1. Conduct electricity in molten or aqueous state.
2. Are highly soluble in water.
3. Have high melting point.
4. Are highly soluble in organic solvents.

44. 25 $cm^3$ of 0.1 M sodium hydroxide reacted completely with 12.49 $cm^3$ of 0.1 M acid Y. Which of the following statements is / are true about the reaction?
1. Sodium hydroxide and Y react in a ratio 1:2
2. Y has two replaceable hydrogens.
3. Y has one replaceable hydrogen.
4. Sodium hydroxide and Y react in a ratio 2:1

45. Chlorine gas was bubbled into a cold solution of sodium hydroxide. The resultant solution contained.
1. $OCl^-$
2. $Cl^-$
3. $Na^+$
4 $ClO_3^-$ and $OH^-$

*Each of the questions 46–50 consists of an assertion (statement) on the left the hand side and a reason on the right hand side. Select*

A. *If both assertion and the 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 correct.*

| INSTRUCTION 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 |

46. When hydrogen chloride gas is bubbled into potassium iodide solution, a brown solution is formed. **Because** Chlorine displaces iodine from its aqueous solution. ☐

47. Electrolysis of brine using graphite electrodes yields chlorine at the positive electrode. **Because** Chloride ions are discharged at the positive electrode. ☐

48. The elements with atomic number 5 and 13 belong to the same group in the periodic table **Because** The elements have the same number of shells. ☐

49. Iron is extracted from its ore by heating with coke. **Because** Carbon is a stronger reducing agent than iron. ☐

50. The same volume of hydrogen gas is evolved when equal volumes of 2 M hydrochloric and 1 M sulphuric acid are reacted with the same mass of magnesium. **Because** Both hydrochloric and sulphuric acid are strong acids. ☐

**END**

Name..... Signature.....

School..... .....Index No.....

**545/1**
**CHEMISTRY**
**Paper 1**
**July/August -2010**
**1 ½ hours**

# WAKISSHA JOINT MOCK EXAMINATIONS

## Uganda Certificate of Education

## CHEMISTRY
## Paper 1

**1 hour 30 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 |
| --- |
| |



**Turn Over**

1. Which one of the following pairs of gases has reducing properties?
   A Sulphur dioxide and carbon dioxide
   B. Sulphur dioxide and hydrogen
   C. Sulphur dioxide and oxygen
   D. Hydrogen and oxygen

2. Which one of the following methods of preparing salts can be employed in the preparation of hydrated Zinc Sulphate?

   A. Direct synthesis
   B. Precipitation
   C. Action of an acid on a metal
   B. Neutralization

3. The pair of hydroxides below that dissolves in sodium hydroxide solution is
   A. $Al(OH)_3$ and $Fe(OH)_3$

   B. $Al(OH)_3$ and $Cu(OH)_2$

   C. $Cu(OH)_2$ and $Zn(OH)_2$

   D. $Zn(OH)_2$ and $Al(OH)_3$

4. Which one of the following compounds whose formulae are given conforms to be general formula $C_nH_{2n+2}$?

   A. $C_3H_8$ and $C_2H_4$
   B. $C_2H_4$ and $CH_4$
   C. $C_2H_6$ and $C_3H_8$
   D. $C_3H_8$ and $C_3H_6$

5. The pair of metals below which can be extracted the same method is .....
   A. Potassium and iron
   B. Sodium and magnesium
   C. Sodium and Copper
   D. Potassium and iron

6. Fractional distillation can be employed to separate a mixture of .....

   A. Water and paraffin
   B. Ethanol and water
   C. Iodine and sulphur
   D. Sodium carbonate and sodium bicarbonate

7. The structure of an atom of element T is ${}^{24}_{12}T$. The formula of the ion T formed most is

A. $T^{2-}$
B. $T^{-}$
C. $T^{2+}$
D. $T^{3+}$

8. Water was added to solid X, a colourless gas was evolved. The gas is likely to be....

A. Carbon dioxide
B. Oxygen
C. Ammonia
D. Hydrogen

9. Substance X burns in oxygen to form a solid which dissolves in water forming solution Z. Z turns red litmus paper blue. X is likely to be .....

A. Sodium
B. Phosphorus
C. Carbon
D. Sulphur

10. Which one of the following gases is a pollutant?

A. Ammonia
B. Nitrogen
C. Methane
D. Sulphur dioxide

11. The reaction between sodium carbonate solution and copper(II) sulphate takes place according to the equation. $CO_3^{2-}(aq) + Cu^{2+}(aq) \longrightarrow CuCO_3(s)$
What volume of 0.1M sodium carbonate is required to precipitate 1.24 g of copper carbonate?

A. 50 $cm^3$
B. 100 $cm^3$
C. 10 $cm^3$
D. 124 $cm^3$

12. Which one of the following salts dissolves in water forming a solution that forms a white precipitate when lead nitrate solution is added to it?

A. Sodium chloride and sodium nitrate
B. Sodium sulphate and sodium carbonate
C. Copper carbonate and copper (II) sulphate
D. Zinc nitrate and Zinc chloride

**Turn Over**

13. An example of a thermosoftening plastic is…

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

14. A current of 0.65A was passed for 35 minutes through dilute sulphuric acid solution. What volume of gas measured at room temperature is evolved at the anode? [1F = 96500C, molar gas volume at room temperature = 24 $dm^3$]

A. $0.0014dm^3$
B. $0.0084dm^3$
C. $0.084dm^3$
D. $0.042dm^3$

15. Which one of the following reaction equations represents an oxidation – reduction reaction?

A. $CuCO_3(s) \longrightarrow CuO(s) + CO_2(g)$

B. $H_2O(l) + Cl_2(g) \longrightarrow HCl(aq) + HOCl(aq)$

C. $Mg(s) + Cl_2(g) \longrightarrow MgCl_2(s)$

D. $Na_2CO_3(aq) + H_2SO_4(aq) \longrightarrow Na_2SO_4(aq) + H_2O(l)$

16. The atomic number of element Z is 20. Which one of the following atoms whose atomic structures are given belongs to the same group of the Periodic Table as Z ?

A. $^{23}_{11}Q$
B. $^{29}_{14}R$
C. $^{35}_{17}S$
D. $^{24}_{12}T$

17. The combustion of methane takes place according to the equation
$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$ What volume of gas remains when 10 $cm^3$ of methane is mixed with 15 $cm^3$ of oxygen, the mixture exploded and allowed to cool to room temperature? [C = 12, O = 16]

A. $10cm^3$
B. $15cm^3$
C. $20cm^3$
D. $30cm^3$

18. A reddish brown gas is evolved when substance M is heated. Which one of the following anions is most likely to be in M?

A. $SO_3^{2-}$
B. $SO_4^{2-}$
C. $CO_3^{2-}$
D. $NO_3^-$

19. Gas Y turns acidified potassium dichromate solution green. Y is likely to be……

A. $SO_2$
B. $CO_2$
C. $CH_4$
D. $NH_3$

20. Calculate the concentration of hydrogen ions in sulphuric acid solution that will evolve $2.24dm^3$ of hydrogen gas measured at stp.

A. 0.4
B. 0.3
C. 0.1
D. 0.2

21. Metal X reacts with sulphuric acid evolving a colourless acidic gas. X is likely to be……..

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

22. Carbon burns in air according to the equation
$C(s) + O_2(g) \longrightarrow CO_2(g)$ $\Delta H = -392\ kJmol^{-1}$ .What mass of carbon burns in oxygen to evolve 39.2 kJ of heat?

A. $\frac{392x12}{39.2}$ g
B. $\frac{12x39.2}{392}$ g
C. $\frac{392x39.2}{12}$ g
D. 12 x 392 x 39.2g

23. Isotopes of an element….
A. belong to the same period of the Periodic Table
B. have the same mass number
C. have the same number of electrons
D. have different number of protons.

24. Electrolysis of a concentrated solution evolved a colourless gas that bleaches blue litmus. The anion in solution is likely to be…
A $Cl^-$
B. $SO_4^{2-}$
C. $OH^-$
D. $I^-$

**Turn Over**

25. The atomic number of element M is 17. The electronic configuration of the ion of M is likely to be...

A. 2 : 8 : 7
B. 2 : 8
C. 2 : 8 : 8
D. 2 : 8 : 6

26. What will be the loss in mass when 12.4g copper carbonate is heated?
[Cu = 64, C = 12, O = 16, $CuCO_3(s) \longrightarrow CuO(s) + CO_2(g)$]

A. $\frac{44x12.4}{124}$
B. $\frac{124x44}{12.4}$
C. $\frac{12.4x124}{44}$
D. 124 x 44 x 12.4

27. Which one of the following pair of substances whose formulae below give off colourless gases when heated?

A. $KNO_3$ and $CuCO_3$
B. $KNO_3$ and $Cu(NO_3)_2$
C. $Zn(NO_3)_2$ and $KNO_3$
D. $Pb(NO_3)_2$ and $NaNO_3$

28. Metal R reacts with the chloride of metal P according to the equation.
$R(s) + PCl_2(aq) \longrightarrow RCl_2(aq) + P(s)$ Metal P displaces hydrogen from dilute acids but Q does not. The order of reactivity of the metals is .....

A. P, Q, R
B. Q, P, R
C. R, Q, P
D. R, P, Q

29. The formula of the sulphate of element M is $M_2(SO_4)_3$. The formula of the chloride of element M is

A. $MCl_3$
B. $MCl_2$
C. MCl
D. $MCl_4$

30. Which one of the following substances dissolves in water to give a solution with pH above 7?

A. $Na_2O_2$
B. $CO_2$
C. KCl
D. $SO_2$

31. The atomic numbers of elements X, Y, Z and W are 12, 13, 14 and 20 respectively. The elements that will react to form a sulphate of the form $MSO_4$ are

A. X, Y, Z and W
B. X and Y
C. X , Y and Z
B. X and W

32. 25 $cm^3$ of 0.1M lead nitrate solution was mixed with 30 $cm^3$ of 0.1M potassium iodide solution. The resultant solution will contain the following ions,

A. $K^+, I^-$
B. $Pb^{2+}, NO_3^-, K^+, I^-$
C. $K^+, I^-, NO_3^-$
D. $Pb^{2+}, NO_3^-$

33. Hydrocarbon X, molecular mass 58 contains 14.3% hydrogen. The molecular formula of X is?

A. $C_4H_{12}$
B. $C_4H_6$
C. $C_4H_{10}$
D. $C_4H_8$

34. Compounds with the same molecular formula but different structures are called?

A. isomers
B. monomers
C. polymers
D. isotopes

35. Which one of the following contains the same number of moles as 10$cm^3$ of a 5M monobasic acid solution? [Molar gas volume at stp = 22.4$dm^3$]

A. 17g of ammonia gas
B. 112$dm^3$ of oxygen measured at stp
C. 112$cm^3$ of oxygen measured at stp
D. 12g of carbon

36. Lead(II) nitrate solution can be used to distinguish between which one of the following pairs of ions in solution?.

A. $SO_4^{2-}$ and $CO_3^{2-}$
B. $Zn^{2+}$ and $Al^{3+}$
C. $Cl^-$ and $CO_3^{2-}$
D. $Cl^-$ and $NH_4^{3+}$

37. Calculate the mass of oxygen required to completely react 0.64g of copper. Copper reacts with oxygen according to the equation $2Cu(s) + O_2(g) \longrightarrow 2CuO(s)$, given Cu = 64, O = 16]

A $\frac{0.64x32}{128}$

B. $\frac{0.64}{64}x32$

C. $\frac{64x32}{0.64}$

D. $\frac{0.64x2x32}{64}$

38. Select from the list below, a pair of acid salts

A. $NaHCO_3$ and $NaHSO_4$

B. $Na_2CO_3$ and $NaSO_4$

C. $CH_3COONa$ and $Na_2C_2O_4$

D. $KNO_3$ and $NH_4Cl$.

39. Which one of the following are used as catalysts in industries?

A. Platinum and Vanadium

B. Platinum and Vanadium pentaoxide

C. Iron and nickel

D. Copper and iron.

40. Which one of the following elements combines to form a compound which conducts electricity in the aqueous state?

A. Magnesium and carbon dioxide

B. Magnesium and chlorine

C. Copper and tin

D. Copper and aluminum.

***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 the 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. Electrolysis of dilute sodium Hydroxide evolves hydrogen at the anode. **Because** Sodium hydroxide solution contains hydrogen ions.

42. An oxide ion has a noble gas configuration. **Because** Oxygen gains electrons forming an oxide ion.

43. Sulphur dioxide and hydrogen chloride are acid anhydrides. **Because** Both gases dissolves in water to form acids.

44. Atomic size decreases along a period of the Periodic Table. **Because** Atomic number increases along a period of the PeriodicTable.

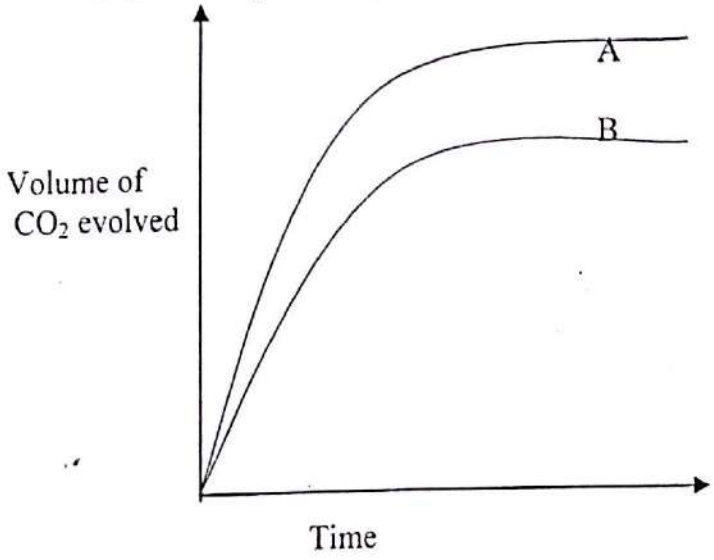
45. Complete combustion of ethanol and fermentation of glucose are exothermic processes. **Because** Ethanol and glucose contain carbon atoms.

***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 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

| Instructions summarized | | | |
|---|---|---|---|
| A | B | C | D |
| 1, 2, 3 only correct | 1, 3 only are correct | 2, 4 only correct | 4 only is correct |

46. Calcium carbonate powder was reacted with dilute hydrochloric acid, the volume of carbondioxide evolved was plotted against time as shown in the graph below.




Curve A can be obtained by

1. Using marble chips
2. Increasing the concentration of acid
3. Adding more acid
4. Increasing temperature.

47. Zinc nitrate crystals were heated. The observation made was

1. A colourless vapour
2. Reddish brown fumes
3. A white residue when cold
4. Oxygen gas

48. An aqueous solution X forms a white precipitate when reacted with excess aqueous ammonia. The likely cations in X are;-

1. $NH_4^+$, $Mg^{2+}$ $Zn^{2+}$
2. $Ca^{2+}$, $Zn^{2+}$ $NH_4^+$
3. $Al^{3+}$, $Ca^{2+}$, $NH_4^+$
4. $Mg^{2+}$ $Pb^{2+}$ $Al^{3+}$

49. Which of the following reactions yield chlorine?

1. Heating lead(II) chloride
2. Reacting concentrated sulphuric acid and sodium chloride
3. Reacting ammonia with concentrated hydrochloric acid
4. Heating a mixture of concentrated hydrochloric acid and manganese(IV) oxide.

50. Which of the following cations in solution forms a white precipitate when added to a soap solution?

1. $Mg^{2+}$
2. $Zn^{2+}$
3. $Ca^{2+}$
4. $Al^{3+}$

**END**

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

Signature.....

545/1
CHEMISTRY
Paper 1
July/August 2009
1 hour 30 minutes

# WAKISSHA JOINT MOCK EXAMINATIONS
## Uganda Certificate of Education

## CHEMISTRY
## Paper 1
## 1 hour 30 minutes

**Instructions:**

1. Attempt **all** questions.
2. Write A, B, C or D in the box against each question number in ink.

1. Which one of the following statements is true about the chlorine atom and the chloride ion?
   A. Both have the same electronic configurations.
   B. The chloride atom has more electrons than the chloride ion.
   C. The chloride ion has more protons than the chlorine atom.
   D. The chloride ion had more electrons than the chlorine atom.

2. The formula of an oxide of an element X is $X_2O$. The formula of an ion of element X is
   A. $X^{2+}$
   B. $X^{+}$
   C. $X^{-}$
   D. $X^{2-}$

3. The electronic configuration of an element X is 2.8:1. Which one of the following statements is true about element M below X in the period table?
   A. M forms an oxide with the formula MO
   B. The formula of the ion of M is $M^{+}$.
   C. M forms a covalent compound with oxygen.
   D. The formula of the ion of M is $M^{2+}$

4. Which one of the following statements is true about mixtures separated by fractional crystallization?
   A. The components have the same solubility.
   B. One component is soluble in water and the other is not.
   C. The components have different solubilities.
   D. The components are immiscible.

5. A current of 0.2A was passed for 60 minutes through dilute sulphuric acid. The volume of gas evolved at the anode measured at s.t.p is (Molar gas volume at s.t.p = $22400cm^3$, 1F = 96500C).
   A. 0.042*l*
   B. 0.42*l*
   C. 4.20*l*
   D. 420*l*

6. Aqueous chlorine is a bleaching agent. The ion responsible for the bleaching action of chlorine has the formula.
   A. $Cl^{-}$
   B. $ClO_3^{-}$
   C. $OCl^{-}$
   D. $ClO_4^{-}$

7. $20.0cm^3$ of 0.2M sodium hydroxide required 20.0 $cm^3$ of an acid $H_2X$. The value of X in the acid is

A. 2
B. 1
C. 3
D. 4

8. The pair of salts below that can be prepared by direct combination is

A. Iron(III) chloride and sodium chloride.
B. Iron(III) chloride and iron(II) sulphate.
C. Iron(III) chloride and copper(II) sulphate.
D. Iron(III) chloride and lead(II) chloride.

9. When sodium hydroxide solution was added to an aqueous solution of X a white precipitate soluble in excess sodium hydroxide was formed. The likely cations in X are

A. $Zn^{2+}$, $Al^{3+}$, $Ba^{2+}$
B. $Al^{3+}$, $Ba^{2+}$, $Pb^{2+}$
C. $Pb^{2+}$, $Mg^{2+}$, $Ba^{2+}$
D. $Al^{3+}$, $Pb^{2+}$, $Zn^{2+}$

10. Which one of the following chemical process requires a catalyst?

A. $2SO_2(g) + O_2(g) \longrightarrow 2SO_3$
B. $S(s) + O_2(g) \longrightarrow SO_2(g)$
C. $H_2O(l) + SO_3(g) \longrightarrow H_2SO_4(aq)$
D. $H_2S_2O_7(aq) + H_2(l) \longrightarrow 2H_2SO_4(aq)$

11. When 0.4g of an organic compound of molecular mass = 46 was burnt the heat produced raised the temperature of 100g of water from 25 to 45°C. The heat of combustion of the compound is (S.H.C for water = $4.2Jg^{-1}{}^0C^{-1}$)

A. 96.6 $kJmol^{-1}$
B. 9660 $kJmol^{-1}$
C. 966 $kJmol^{-1}$
D. 9.66 $kJmol^{-1}$

12. Which one of the following pairs of anions is formed when chlorine is bubbled into a cold aqueous solution of sodium hydroxide?

A. $ClO_3^-$ and $ClO_4^-$
B. $Cl^-$ and $ClO_3^-$
C. $Cl^-$ and $OCl^-$
D. $OlC^-$ and $ClO_3^-$

13. A colourless gas extinguishes a burning splint. The formula of the gas is

A. CO
B. $SO_2$
C. $SO_3$
D. $CO_2$

14. When chlorine gas is bubbled into aqueous iron(II) chloride the solution turns yellow. Which one of the following statements is true about the reaction?

A. Chlorine gains electrons.
B. Chlorine looses electrons.
C. Iron(II) ions in solution gains elections.
D. Both Chlorine and iron(II) ions gains electrons.

15. Which one of the following equations represents a sublimation process?

A. $(NH_4)_2SO_4(s) \longrightarrow 2NH_3(g) + H_2SO_4(g)$
B. $2KClO_3(s) \longrightarrow 2KCl(s) + 3O_2(g)$
C. $ZnCO_3(s) \longrightarrow CO_2(g) + ZnO(s)$
D. $2Fe(s) + 3Cl_2(g) \longrightarrow 2FeCl_3(g)$

16. The hydroxide below which dissolves in sodium hydroxide solutions is

A. $Cu(OH)_2$
B. $Pb(OH)_2$
C. $Mg(OH)_2$
D. $Ca(OH)_2$

17. Zinc reacts with dilute sulphuric acid according to the following equations.
$Zn(s) + H_2SO_4(aq) \longrightarrow ZnSO_4(aq) + H_2(g)$.

The number of moles of hydrogen ions required to react completely with 7.0g of Zinc is given by the expression (Zn = 65 )

A. $7 \times 2 \times 65$
B. $\frac{7}{65}$
C. $\frac{7 \times 2}{65}$
D. $\frac{65 \times 2}{7}$

18. Which one of the following equations takes place at the anode when an aqueous solution of copper(II) sulphate is electrolyzed using a copper anode?

A $4OH^-(aq) \longrightarrow 2H_2O(l) + O_2(g) + 2e$

B. $H^+(aq) + e \longrightarrow \frac{1}{2} H_2(g)$.

C. $Cu^{2+}(aq) + 2e \longrightarrow Cu(s)$.

D. $Cu(s) \longrightarrow Cu^{2+}(aq) + 2e$

19. An oxide of element X contains 41% by mass of oxygen. The simplest formula of the oxide is

A. $X_2O_2$

B. XO

C. $X_2O_3$

D. $XO_2$

20. What volume of 0.125M acid HX will be required to neutralize $25.0cm^3$ of 0.05 M sodium carbonate solution?

A. $15cm^3$

B. $10cm^3$

C. $20cm^3$

D. $25cm^3$

21. When water was added to a solid X, a colourless gas which turns red litmus blue was evolved. X is likely to be a ....

A. Nitrate

B. Sulphite

C. Nitride

D. Sulphate

22. The most abundant component of air is

A. water vapour

B. Rare gas

C. Nitrogen

D. Carbon dioxide.

23. Which one of the following concentrated acids can be used in the laboratory preparation of chlorine gas?

A. Sulphuric acid

B. Nitric acid

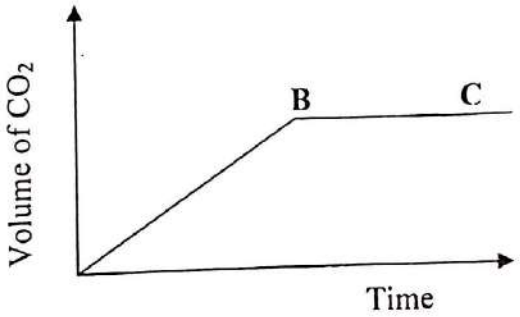
C. Ethanoic acid.

D. Hydrochloric acid.

24. Select from the list below a pair of strong acids.
A. Hydrochloric acid and nitric acid.
B. Ethanoic acid and nitric acid.
C. Ethanoic acid and sulphuric acid.
D. Carbonic acid and nitric acid.

25. An aqueous solution of solid X forms a yellow precipitate when lead nitrate solution is added to it. The likely anion in X is
A. A Chloride
B. An iodide
C. A sulphate
D. A carbonate

26. The graph below shows the variation of volume of carbon dioxide with time when calcium carbonate is reacted with dilute hydrochloric acid.




Which one of the following statements is true about region BC of the graph?
A. The reaction is still on going.
B. All the reactants have been consumed.
C. Carbondioxide is evolved at the same rate.
D. The rate of the reaction is constant.

27. Calculate the volume of 0.5M sulphuric acid needed to make 500 $cm^3$ of 0.02 M sulphuric acid.
A. 20$cm^3$
B. 10$cm^3$
C. 30$cm^3$
D. 40$cm^3$

28. Which one of the following gases is a pollutant?
A. Ethene
B. Sulphur dioxide
C. Ethane
D. Ammonia.

29. Which one of the following compounds conforms to the $C_nH_{2n}$ formula?

Methane
Propane
Ethene
Ethane

30. Element X reacts with the oxide of Y. The equation of the reaction between Z and a solution of X is

$Z(s) + X^{2+}(aq) \longrightarrow X(s) + Z^{2+}(aq)$. The order of reactivity of the elements is

A. Y, Z, X (C) Z, Y, X
B. X, Z, Y (D) Z, X, Y

31. The atomic numbers of element W, X, Y and Z are 8, 7, 17 and 12 respectively. The elements that react to form an ionic compound are

A. X and Z
B. W and X
C. Y and Z
D. X and Y

32. Carbon reacts with lead(II) oxide according to the equation

$PbO(s) + C(s) \longrightarrow Pb(s) + CO(g)$.

Which property of carbon is illustrated in the reaction above?

A. Combustion and reducing property.
B Oxidizing property.
C. Reducing property.
D. Combustion property.

33. Sulphur dioxide burns in air according to the equation,

$2SO_2(g) + O_2(g) \longrightarrow 2SO_3(g)$. Calculate the volume of sulphur dioxide that will burn when 50 $cm^3$ of sulphur dioxide is combined with 20$cm^3$ of oxygen.

A. 25$cm^3$
B. 50$cm^3$
C. 20$cm^3$
D. 40$cm^3$

34. Which pair of metals below can be extracted by the same method?

A. Sodium and iron
B. Sodium and potassium
C. Sodium and copper
D. Sodium and Zinc

35. Which one of the following substance is produced during the electrolysis of brine using mercury cathode?

A. Water
B. Sodium hydroxide and water.
C. Sodium Hydroxide and hydrogen.
D. Hydrogen

36. Which one of the following statements is true about the test for sulphur dioxide gas in the laboratory?

A. The combustion property of the gas is used.
B. The green solution turns orange.
C. The reducing property of the gas is used.
D. The oxidizing proper of the gas is used.

37. Magnesium reacts with dilute hydrochloric acid according to the equation.
$Mg\ (s) + 2H + (aq) \longrightarrow Mg^{2+}\ (aq) + H_2(g)$. What volume of 0.1MHCl will react with magnesium to evolve 40 $cm^3$ of hydrogen gas measured at room temperature? (Molar gas volume at room temperature = 24000$cm^3$)

A. 3.33 $cm^3$
B. 166.7$cm^3$
C. 16.67$cm^3$
D. 33.3$cm^3$

38. When zinc carbonate was strongly heated, 2.24$cm^3$ of gas measured at s.t.p was produced. What was the mass of the residue?
(Zn = 65, O = 16 Molar gas volume at s.t.p = 22. 4*l*)

A. 8.1 g
B. 18 g
C. 16.2g
D. 1.62 g

39. Which one of the following pairs of carbonates dissolves in water?

A. $K_2CO_3$ and $Na_2CO_3$
B. $K_2CO_3$ and $MgCO_3$
C. $K_2CO_3$ and $ZnCO_3$.
D. $K_2CO_3$ and $FeCO_3$.

40. Which one of the following factors would increase the rate of the reaction?
$2H_2O_2(aq) \longrightarrow 2H_2O(l) + O_2(l)$

A. Addition of platinum
B. Use of a big volume of hydrogen peroxide
C. Addition of manganese(IV) oxide
D. Addition of finely divide iron.

**In each of the questions 41 to 45, 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, 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. Select from the list below, gas(es) with reducing properties.
    1. Ammonia
    2. Sulphur dioxide
    3. Hydrogen
    4. Carbon dioxide

42. Which of the following cation(s) form precipitates soluble in excess aqueous ammonia?
    1. Zinc ions
    2. Lead(II) ions
    3. Copper(II) ions.
    4. Aluminium ions.

43. Zinc powder was added to an aqueous solution of copper(II) sulphate. Which one of the following statements is true about the reaction?
    1. A brown solid is formed.
    2. Zinc is reduced to zinc ions.
    3. Copper is displaced by zinc.
    4. Copper(II) ions in solution are oxidized to copper.

44. Which of the following substance(s) is/are potential pollutants?
    1. Ammonia gas
    2. Polythene
    3. Ethane
    4. Sulphur dioxide gas.

45. Which one of the following metals only reacts with concentrated sulphuric acid?
    1. Mg
    2. Ca
    3. Fe
    4. Cu

**Each of the questions 45 -50- 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 the reason are the statement 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 |

46. The atom $^{23}_{11}X$ and $^{24}_{12}Y$ form ionic chlorides **Because** X and Y belong to the same group in the period table. ☐

47. According to the kinetic theory of gas molecules are in a state of continuous motion. **Because** There are no forces of attraction between gas molecules. ☐

48. Electrolysis of dilute sulphuric Acid between platinum electrodes produces oxygen at the anode **Because** $OH^-$ ion is lower than $SO_4^{2-}$ ion in the series. ☐

49. Iron(II) sulphide and iron (III) chloride are prepared by direct combination **Because** Iron is able to form compounds in which it has different valency. ☐

50. Water is an oxide of hydrogen **Because** Water contains hydrogen and oxygen molecules. ☐

**END**