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*545/1*

*Chemistry*

*Paper 1*

*1 ½ hours*

UCE MOCK EXAMINATIONS 2017

UGANDA CERTIFICATE OF EDUCATION

CHEMISTRY

PAPER 1

1 HOUR 30MINUTES

***Instructions***

* This paper consists of 50 compulsory objective questions
* Answer the questions by writing the correct alternative in the box on the right side of the question.

1. The number of electrons in one atom of the element represented by is

A: 3 B: 4 C: 7 D: 10

1. Which one of the following oxides will dissolve in dilute sodium hydroxide but not in dilute nitric acid?

A: Al2O3 B: ZnO C: PbO D: SiO2

1. Permanent hardness may be removed from water by the addition of large quantities of

A: Ca(HCO3)2 B: Ca(OH)2 C: K2CO3 D: CaCO3

1. Which one of the following gases is formed when is formed when excess ammonia gas is reacted with chlorine?

A: Nitrogen monoxide B: Dinitrogen oxide

C: Hydrogen chloride D: Nitrogen

1. Iron was allowed to rust in 1 litre of moist air and the volume of air remaining were measured at atmospheric pressure each day. The results were as follows:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Days | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Volume cm3 | 1000 | 950 | 900 | 860 | 830 | 810 | 800 | 800 | 800 | 800 |

If unrusted iron remained at the end of the experiment, which one of the following is incorrect statement from this experiment?

A: of air is oxygen

B: of air does not react with iron

C: The reaction had stopped after six days.

D: Rusting occurs at a constant rate.

1. Why is a salt containing the radical HSO4 –  known as an acid salt?

A: the radical liberates hydrogen ions in aqueous solution.

B: the radical contains hydrogen

C: the radical has a negative charge

D: a salt containing the radical is derived from sulphuric acid

1. A metal Y has no reaction with warm water, but precipitates copper from copper (II) sulphate solution with the formation of a colourless solution. Y may be

A: potassium B: zinc C: lead D: magnesium

1. If carbon dixode is bubbled into calcium hydroxide solution for a very long time and dilute hydrochloric acid is then added, the solution would:

A: go clear B: go cloudy

C: remain the same D: effervescence

1. 1cm3 of dilute sulphuric acid was added to four test tubes containing solutions of different cations as shown below

Ba2+ Zn2+ Pb2+ Mg2+

I II III IV

The white precipitate was obtained in test tube numbers

A: I, II, IV B: I, III, IV C: I, III D: III, IV

1. 20.0cm3 of dilute sulphuric acid needed 25.0cm3 of 0.1M sodium hydrogen carbonate solution for complete neutralization. The molarity of the sulphuric acid is

1. Which one of the following oxides decreases in mass when heated in a current of dry carbon monoxide?

A: calcium oxide B: zinc oxide

C: magnesium oxide D: Aluminium oxide

1. When potassium manganate (VII) is heated it decomposes according to the equation:

2KMnO4(s) K2MnO4(s) + MnO2(s) + O2(g)

If 1.58g of potassium manganate (VII) are heated, the maximum volume, in cm3 of oxygen (under conditions of temperature and pressure where one mole of molecules of a gas occupies 24 litres) that can be evolved is. (Mn = 55, K = 39, 0=16)

A: 60 B: 120 C: 240 D: 480

1. Element T reacts with hydrogen to form a hydride with the formula TH3 and forms acid oxides. To which one of the following groups in the periodic table does T belong?

A: I B: III C: V D: VII

1. Butane burns in air according to the following equation

C4H10(g) + O2(g)  4CO2(g) + 5H2O(l) ∆H= 2880 Kjmol –

The quantity of heat evolved when 16dm3 of butane is burnt at s.t.p is. (1 mole of a gas occupies 22.4dm3 at s.t.p)

A: B: C: D:

1. The atomic numbers of elements Q,R,T and W are 2,15,19, and 20 respectively. Which one of the elements shows similar properties as an element with atomic number 10?

A: Q B: R C: T D: W

1. All of the following apply to carbon dioxide except. It

A: is acidic in character

B: is reduced when heated with carbon

C: supports the combustion of sulphur

D: is covalent in character

1. Which one of the following remains as a solid residue when hydrated iron (II) sulphate is strongly heated?

A: Iron (II) oxide B: Iron (III) oxide

C: Triiron tetroxide D: Iron (III) sulphate.

1. Which one of the following reactions is catalysed by platinum gauze on an industrial scale?

A: 2SO2(g) + O2(g) 2SO3(g)

B: 2NO(g) + O2(g) 2NO2(g)

C: 4NH3g) + 5O2(g) 4NO4(g) + 6H2O(g)

D:2NH3(g) + H2SO4 (aq) (NH4)2SO4(aq)

1. Iron reacts with dilute sulphuric acid according to the following equation

H2SO4(aq) + Fe(s) FeSO4(aq) + H2(g)

The number of moles of hydrogen ions required to react completely with 2.8g of iron is

A: B: C: 2.8 x 2 x 56 D:

1. Which one of the following nitrates will leave no solid residue after strong heating?

A: silver nitrate B: Ammonium nitrate

C: potassium nitrate D: calcium nitrate.

1. Ammonium sulphate reacts with potassium hydroxide according to the equation

(NH4)2SO4(s) + 2KOH(aq) K2SO4(aq) + 2NH3(g) + 2H2O(l)

Calculate the volume of ammonia at room temperature, produced when 2.64g of ammonium sulphate is reacted with potassium hydroxide. (N = 14, S = 32, O = 16, H = 1, 1 mole of a gas occupies 24dm3 at room temperature)

A: 0.48dm3 B: 0.96dm3 C: 1.92dm3 D: 4.80dm3

1. The graph below shows the variation of volume of carbon dioxide evolved with time when excess 5M hydrochloric acid was added to calcium carbonate, the mass used being the same in each case. Why are the graphs different?

X – graph powdered

Calcium carbonate. Y- graph

Volume of carbon dioxide X for lump carbonate

(cm3)

Y

Time (s)

A: different concentrations of calcium carbonate were used.

B: volume of gas evolved is independent of mass of solids

C: the rate at which the reaction proceeds depends on particle size

D: powdered calcium carbonate catalyses the reaction.

1. Which one of the following is a reason why covalent compounds usually have low melting points?

A: because covalent bonds are weaker than ionic bonds

B: because covalent compounds exist as separate molecules

C: because covalent bonds are easily broken by heat but ionic bonds are not.

D: because covalent compounds are soluble in organic solvents.

1. Which one of the following gases is used in industrial preparation of nitrogen fertilizers?

A: Ammonia B: Nitrogen dioxide

C: Dinitrogen oxide D: Nitric oxide.

1. Propane burns in oxygen according to the following equation.

C3H8(g) + 5O2(g) 4H2O(l) + 3CO2(g)

The volume of oxygen required for complete combustion of propane to produce 45dm3 of carbon dioxide is

A: 225dm3 B: 27dm3 C: 15dm3 D: 75dm3

1. Which one of the following represents the reaction at the anode during electrolysis of copper (II) sulphate using copper electrodes?

A: 4ŌH(aq) 2H2O(l) + O2(g) + 4e B: Cu(s) Cu2+ (aq) + 2e

C: Cu2+(aq) + 2e Cu(s) D: 2H+(aq) + 2e H2(g)

1. Which one of the following is not a property of graphite?

Graphite

A: is a good conductor of electricity

B: burns in oxygen to produce carbondioxide

C: is soft

D: is colourless and transparent

1. Which one of the following ions will react with a hot solution of sodium chloride to form a colourless solution which forms needle like crystals on cooling

A: Pb2+  B: Cu2+ C: Fe2+ D: Fe3+

1. 25.4g of metal W, reacts completely with 22.6g of oxygen to form an oxide. Which one of the following is the formula of the oxide of W?

(O = 16, W = 27)

A: WO2 B: W2O C: W2O3 D: W3O2

1. Which one of the following is not an ore of iron?

A: Magnetite B: steel C: Haematite D: Siderite

1. Which one of the following alloys contains coppere?

A: solder B: magnalium C: steel D: Duralumin

1. Which one of the following is characteristic of the element of electronic configuration 2:4?

A: forms ions by electron loss B: will form an acidic and a neutral oxide

C: does not conduct electricity D: is a gas at room temperature

1. An aqueous solution of potassium iodide turns brown when a solution X is added to it. Which one of the following is likely to be solution X?

A: chlorine water B: lead (II) nitrate

C: iron (III) sulphate D: copper (II) sulphate

1. The percentage by mass of nitrogen in a mole of magnesium nitride is

(Mg = 24, N = 14)

A: 72 B: 48 C: 28 D: 42

1. Copper can be separated from a mixture of zinc powder and copper powder by adding to the mixture

A: concentrated sulphuric acid B: dilute sulphuric acid

C: zinc sulphate solution D: concentrated nitric acid

1. 50cm3 of 0.5M aqueous copper (II) sulphate solution was mixed with excess zinc powder in plastic bottle. The temperature of the solution increased by 25oC as a result of the reaction. The approximate heat of reaction per mole of copper (II) ions is

A: + 105KJ B: – 105 KJ C: + 210KJ D: – 210 KJ

1. Which one of the following acids is completely dissociated in aqueous solution?

A: Carbonic acid B: Ethanoic acid

C: Nitric acid D: citric acid

1. A liquid L reacts with sodium chloride to give a colourless gas which fumes with ammonia liquid L is likely to be

A: concentrated hydrochloric acid B: concentrated sulphuric acid

C: absolute ethanol D: dilute nitric acid

1. The process by which the properties of rubber are improved by heating it with sulphur is called

A: polymerization B: catalysis C: dehydration D: vulcanization

1. Which one of the following salts can be prepared by action of dilute acid on a metal?

A: PbCl2 B: CuSO4 C: ZnSO4 D: AgCl

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 SUMMARISED

|  |  |
| --- | --- |
| Assertion | Reason |
| A: True  B: True  C: True  D: Incorrect | True (reason is correct explanation )  True (Reason not a correct explanation)  Incorrect  Correct |

|  |  |  |
| --- | --- | --- |
| 1. Nitrogen is essential for plants and animals | because | free nitrogen forms approximately 80% of the atmosphere |
| 1. Iron is used as the cathode in the electrolysis of fused sodium chloride in industry | because | sodium is more electropositive than iron |
| 1. Amphoteric oxides have same chemical properties as basic oxides | because | amphoteric oxides will neutralize mineral acids |
| 1. Ethanol is obtained by the fermentation of glucose | because | Enzymes convert glucose to ethanol and carbondioxide |
| 1. The heat of combustion of methane is less than that butane,C4H10 | because | a molecule of butane is smaller than a molecule of methane. |
|  |  |  |

In each of the questions 46 to 50, one or more of the answers given may be correct. Read each question carefully and then indicate the correct answer according to the following

A: If 1,2 and 3 only are correct

B: If 1 and 3 only are correct

C: if 2 and 4 only are correct

D: If 4 only is correct

1. Which of the following reactions occurs when sodium metal is exposed to moist air?
2. 4Na(s) + O2(g) 2Na2O(s)
3. Na2O(s) + H2O(l) 2NaOH(aq)
4. 2NaOH(aq) + CO2(g) Na2CO3. H2O(s)
5. 2Na(s) + 2H2O(l) 2NaOH(aq) + H2(g)
6. For which of the following is chlorine used?
7. Sterilization of water supplies
8. Manufacture of bleaching agents
9. Manufacture of hydrogen chloride
10. Manufacture of detergents
11. Which of the following will increase the yield of ammonia from the reaction between nitrogen and hydrogen?
12. Increased pressure
13. Increased temperature
14. Use of a catalyst
15. By reacting dry gases only.
16. Which of the following will reduce copper (II) oxide to the metal?
17. Methane
18. Ammonia
19. Sulphur dioxide
20. Hydrogen
21. Why is oxygen evolved from chlorine water which has been standing for some time?
22. Hydrochloric acid liberates oxygen in sunlight
23. Chlorine displaces oxygen from water
24. Chlorine ionizes in water
25. Hypochlorous acid liberates oxygen in sunlight.

**END**