233/2

CHEMISTRY

PAPER 2

(THEORY)

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2 hours

 NAIROBI SCHOOL

 POST MOCK 2016

 KENYA CERTIFICATE OF SECONDARY EDUCATION (KCSE)

1. study the information in the table below and answer the question that follow

Element Atomic number melting point 0C

M 9 -220

N 17 -101

P 35 -7

(i) What is the name given to the group that elements MNP belong (1 mark)

(ii) What is the process called in which M,N and P form ions (1 mark)

(iii) Write the electronic configuration of element N (1 mark)

(iv) What is the trend in the melting point ? Explain (2marks)

(v) How would the reactivity of magnesium and element M and N compare? Explain (3marks)

(vi) The formula of the oxide of N is N2O7 and has a relative molecular mass of 182.Assuming that only one isotope is involved ,determine the number of neutrons in one atom of element N (3marks)

(vi) Give one use of element N (1mark)

2.The set up below was used to prepare and collect dry nitrogen gas

Bottomed falsk

Reagents A+B

 Heat

(a) Complete the diagram to show how a dry sample of Nitrogen gas can be collected (3marks)

(b) Name reagents A (2marks)

 B

(c) Write an equation for the reaction that takes place when water is added to the product formed when burning magnesium ribbon is put in gas jar full of Nitrogen gas (2marks)

(d)Nitrogen can be used to fill light bulbs ,give a reason for this (1mark)

(e) Give one physical and chemical property of Nitrogen gas (2marks)

(f) Ammonia Nitrate is one of the fertilizers manufactured from Nitrogen compounds .Name the reagents used to manufacture Ammonium Nitrate and calculate the percentage of Nitrogen in it (N=14,H=1,O=16) (3marks)

3.(a) Draw the structural formulae of the following compound

(i) Pent-1-yne (1mark)

(ii) 2 methlyButene (1mark)

(b) Two test tubes C and D contain ethanol in tube C and D has propanol.Give a test that will tell the difference of the two (3mark)

(c)(i) Name the type of reaction in which propene forms polypropene (1mark)

(ii) Give the condition of the above reaction (2mark)

(d) Write an equation showing how ethanol is converted to ethane gas (1mark)

(e) When Bromine gas is bubbled in ethane gas compound E is formed .write the formula of E (1mark)

(f) Give the observation made when sodium carbonate is added to solution of prpanoic acid (2 marks)

4.(a) The following are standard reduction potentials for four half –cells.Study them and answer the questions that follow .the letters do not represent the actual symbols of the element

 E0(volts)

P2(aq)+2e 2P-(aq) +0.54

2Q+(aq)+2e Q2(g) 0.00

R2+(aq)+2e R(S) -0.44

S2+(aq)+2e S(s) +0.34

(i) Identify the strongest oxidizing agent (1mark)

(ii) Which element is likely to be hydrogen .give a reason (2marks)

(iii) Calculate the E0 value for the cell that would give the highest voltage when two half cells are combined (2marks)

(b) The diagram below shows a set up of electrolysis of 2M sulphuric VI acid

(i) Write an equation for the reaction that produces gas K (1mark)

(ii) Name gas M (1mark)

Gas K

 Gas M

2M2 2M sulphuric vi acid

 Patinum

battery

(iii) Gas M and gas K are produced in different volumes as shown in the set up exaplain this difference

 (2marks)

(vi) give one industrial use of electrolysis (1mark)

5.In an experiment to determine the molar heat of displacement of lead using zinc powder.4g of zinc powder was added to 40cm3 of 0.2M lead Nitrate solution .At the end of the experiment the temperature rose by 90C

 (a) Write an ionic equation for this reaction (1mark)

 (b) State two observation that could be made (2marks)

(c) Define molar heat of displacement (1mark)

(d) Calculate the heat evolved in this experiment (specific heat capacity=4.2jg-1k-1 and density of solution is 1.0 g/cm3 (2marks)

(e) Calculate the molar heat of displacement (1mark)

(e) State two errors in the experiment (2mark)

6. The flow cahrt below shows some reactions .study it and answer the questions that follow

 II

W

 Water magnesium

Solution P

Hydrogen chloride gas

 I oxide

 III PbCO3

PbCl2

(a)(i)Name solution p (1mark)

Name product W (1mark)

(b) Write equation for formation of W (1mark)

(c) Give the name of reaction in step II (1mark)

(d) Explain why its not suitable to prepare lead II chloride using step III (2marks)

(e)(i) What precautions should be taken when carrying the experiment in the flow chart (2marks)

(ii) Draw a diagram showing how step 1 is done in the laboratory (2marks)