

**ICSE-1999****Section A (40 Marks) (Attempt all questions from this section)****Question 1**

(a) Chlorine is subject of the following question:

(i) What is the atomicity of chlorine? \_\_\_\_\_.

(ii) *Name the compounds formed when chlorine reacts with water.*

(iii) Chlorine reacts with white phosphorous forming phosphorous tri-chloride and phosphorous penta-chloride.

Write balanced equations for the formation of each of these compounds.

(b) Answer the questions, relating your answers only to salts in the list given:

Anhydrous calcium chloride, copper sulphate 5-water, sodium carbonate 10-water.

(i) Which compound is efflorescent?

(ii) Which compound is blue in colour?

(iii) Which compound is deliquescent?

(iv) What would be seen on mixing a solution of calcium chloride with solution of sodium carbonate

(v) Write the balanced equation for the reaction occurring when a solution of calcium chloride is mixed with a solution of sodium carbonates.

(c) In this question you are required to supply the word (or words) that will make each sentence into correct statement which is to be written down in full.

Example: Sodium reacts with chlorine to form sodium chloride

Molten sodium reacts with chlorine to form sodium chloride.

(i) The electrolysis of lead bromide liberates lead and bromine.

(ii) Copper sulphate crystals are dehydrated by sulphuric acid.

(iii) Calcium nitrate reacts with sodium sulphate to form calcium sulphate  
(same is required in 2 places)

(iv) *Crystal of sulphur are obtained when a solution of sulphur in carbon disulphide is allowed to evaporate.*

(d) If crop of wheat removes 20 kg of nitrogen per hectare of soil, what mass of fertilizer calcium nitrate  $[\text{Ca}(\text{NO}_3)_2]$  would be required to replace nitrogen in 10 hectare field? (Ans to nearest kg.)

(e)

(i) A vessel contains  $N$  molecules of  $\text{O}_2$  at a certain temperature and pressure. How many molecules of  $\text{SO}_2$  can the vessel accommodate at the same temp and pressure

(ii) Each of two flasks contains 2.0g of gas at the same temperature and pressure. One flask contains oxygen and the other hydrogen.

1. Which sample contains the greater number of molecules?

2. If the hydrogen sample contains  $N$  molecules, how many molecules are present in oxygen sample?

- (iii) A gas sample occupies 4 liters at  $27^{\circ}\text{C}$  and  $P$  atmospheric pressure.  
What would be its volume at  $327^{\circ}\text{C}$  and  $2P$  atmospheric pressure?

D

A

- (f) Describe in each case, one chemical test that would enable you to distinguish between following pairs of chemicals.  
Describe what happens with each chemical or state "no visible reaction".

H

[9]

S

- (i) Sodium chloride solution and sodium nitrate solution.

- (ii) Sodium sulphate solution and sodium chloride solution

R

H

- (iii) Calcium nitrate solution and zinc nitrate solution.

- (g) Write balanced equations for each of the following reaction.

- (i) Magnesium heated in nitrogen.

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- (ii) Action of heat on sodium nitrate.

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- (iii) Action of heat on copper nitrate.

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- (iv) Zinc and dilute sulphuric acid.

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- (v) Ethene and hydrogen.

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- (vi) Nitrogen monoxide and oxygen.

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V

R

**Section – B (40 marks)****(Attempt any four questions from this section)****Question 2**

(a) Choose correct word or phrase from the brackets to complete following sentences: [4]

(i) Ammonium chloride is a soluble salt prepared by \_\_\_\_\_  
(precipitation, neutralization)

(ii) When ammonium chloride is heated, it undergoes \_\_\_\_\_  
(Thermal decomposition, thermal dissociation.)

(iii) Heating ammonium chloride with sodium hydroxide produces \_\_\_\_\_  
(ammonia, nitrogen)

(iv) Heating solution of ammonium chloride and sodium nitrite produces \_\_\_\_\_  
(ammonia, nitrogen)

(b) Write correctly balanced equation for the reactions mentioned in statement (i) to (iv) above. [4]

R \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

(c) Describe what you see when concentrated nitric acid is added to copper. [2]

\_\_\_\_\_

\_\_\_\_\_

U \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Question 3**

(a)

(i) What is the colour of the flame when sulphur burns in air? [5]

(ii) Name the products formed when sulphur is burnt in air or oxygen? [2]

(iii) When burning sulphur reacts with water, a compound is formed. Name the compound.

V \_\_\_\_\_  
 \_\_\_\_\_

(iv) Write the balanced equation for the reaction between sulphur dioxide and moist chlorine.

(v) In the reaction mentioned in Ques. (iv) above, which substance is the oxidizing agent?

(b)

(i) What is the purpose of contact process?

\_\_\_\_\_.

(ii) Name the catalyst used in the contact process.

\_\_\_\_\_.

(iii) Write the balanced equation for the reaction in the contact process which takes place in the presence of catalyst

\_\_\_\_\_.

(e)

(i) When hydrogen sulphide reacts with oxidizing agent, what substance is always a product of the reaction?

\_\_\_\_\_.

(ii) What is the colour of the precipitate formed when hydrogen sulphide is bubbled through copper sulphate solution?

\_\_\_\_\_.

#### Question 4

(a) With reference to the reaction of copper oxide, Iron (II) oxide, lead (II) oxide and magnesium oxide, place the oxides in order of decreasing order of reduction. That is put first the oxide that is most difficult to reduce, and last, the oxide that is most easily reduced

\_\_\_\_\_.

\_\_\_\_\_.

(b) Write balanced equation for the following reactions:

(i) Reduction of copper oxide by hydrogen.

\_\_\_\_\_.

(ii) Reduction of iron (III) oxide by carbon monoxide.

\_\_\_\_\_.

(iii) Reduction of lead (II) oxide by carbon.

\_\_\_\_\_.

(c)

(i) What is the type of bonding expected in metallic chloride?

(ii) If fused metallic chloride is electrolyzed, at which electrode would the metal be obtained?

(iii) What metallic property is shown by the non metal graphite?

(d)

(i) *Cast iron contains about 40% carbon. By what chemical process is the amount of carbon decreased to make steel?*

(ii) *Which metal is added to steel to make stainless steel?*

**Question 5**

(a) Concentrated nitric acid oxidizes phosphorous to phosphoric acid according to following equation:



(H=1; N=14; O=16; P=31)

(i) What mass of phosphoric acid can be prepared from 6.2 g of phosphorus?

(ii) What mass of nitric acid will be consumed at the same time?

(iii) What will the volume of steam be at the same time of measured at 760 mm Hg pressure and 273°C

V

[3]

A

[2]

S

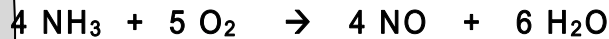
[8]

H

E

R

(b) Ammonia may be oxidised to nitrogen monoxide in the presence of a catalyst according to the following equation:



If 27 litre of reactants are consumed, what volume of nitrogen monoxide is produced at the same temperature and pressure?

[2]

A

H

## Question 6

(a) For each of the compound (i) ethane, (ii) vinegar, (iii) marsh gas, draw relevant structural formula

[6]

(i) ethane

(ii) vinegar

(iii) marsh gas

R

\_\_\_\_\_ . \_\_\_\_\_ . \_\_\_\_\_ .

H

(b)

(i) What word is use to describe these three compounds taken together?

[4]

(ii) What is the special feature of the structure of (1)  $\text{C}_2\text{H}_4$ , (2)  $\text{C}_2\text{H}_2$ ?

(iii) What type of reaction is common to both of these compounds?

V

\_\_\_\_\_ .

R

## Question 7

(a) Define the following terms:

(i) Acid: \_\_\_\_\_

(ii) pH scale: \_\_\_\_\_

(iii) Neutralization: \_\_\_\_\_

(b) (i) Outline the steps that would be necessary to convert insoluble lead (II) oxide into insoluble lead chloride.

(ii) Write the balanced equations for the reaction required to convert insoluble lead (II) oxide into insoluble lead chloride

(iii) If iron reacts with dilute sulphuric acid, what will be the products of sulphuric acid?

(iv) A solution of iron (III) chloride has a pH less than 7. It's the solution acidic or alkaline?

[3]

[7]