

ICSE-1994**Section A (40 Marks) (Attempt all questions from this section)****Question 1****(a) Answer the following:-****(i)** Name the change of state in which naphthalene changes into vapour.

(ii) Name an element which can undergo the same change of state

(iii) Name a common substance which exists in all the three state of matter.

(iv) Dilute hydrochloric acid is added in turn to a mixture of iron and sulphur and to the compound formed between iron and sulphur. Name the gas formed in each case.

(b)**(i)** Place the metals *calcium, iron, magnesium and sodium* in order of their activity with water, place the most active first.

(ii) Write equations for each of the above metals which react with water.

(c) What do you see when each of the following elements is burnt in oxygen?**(i)** (1) Calcium _____

(2) Sulphur. _____

(ii) What type of oxide is formed when each of the following element is burnt in oxygen? **[2]**

(1) Phosphorus _____

(2) Magnesium. _____

(d) Answer the following questions relating to salts and their preparation. [6]

(i) What is a 'Salt'?

D

A

(ii) What kind of salt is prepared by precipitation? (Double decomposition).

(iii) Name a salt prepared by direct combination.

Write the equation for the reaction that takes place when preparing the salt you have named.

H

S

(iv) Name the procedure used to prepare a sodium salt eg. Sodium sulphate.

D

(e)

(i) *Name the two gases formed when candle burns.*

(ii) *Account for the higher percentage of CO_2 in respired air compared to inspired air.*

(iii) Explain why ammonia gas is evolved when water is added to the product formed when magnesium is burnt in air.

(iv) *Name the process used to separate the constituents of liquid air.*

V

(f) The following questions refer to one mole of chlorine gas. [6]

(i) What is the volume occupied by this gas at s.t.p.?

R

(ii) What will happen to the volume of the gas if the pressure is doubled?

D

A

(iii) What volume will the gas occupy at 273°C ?

(iv) If the relative atomic mass of chlorine is 35.5, what will be mass of one mole of chlorine gas.

S

(g) Answer the following:-

[5]

(i) What is proton?

(ii) What is the significance of the number of protons found in the atoms of each of the different elements?

H

(iii) What is the relation between the no. of protons and the no. of electrons in an atom?

(h) Following question relates to electroplating of an article with silver:

[4]

(i) Name the electrode formed by the article to be plated.

(ii) What ions must be present in the electrolyte?

(iii) What should be the nature of the anode?

(iv) How is the passage electricity through the electrolyte different from the passage of electricity through copper wire?

R

Section – B (40 marks)**(Attempt any four questions from this section)****Question 2****(a) Name the ions present in each following components:****[4]**

(i) Compound A when warmed with concentrated sulphuric acid gives a gas which fumes in moist air and which gives dense white fumes with ammonia.

(ii) When barium chloride solution is added to a solution of compound B, a white precipitate insoluble in dilute hydrochloric acid is formed.

(iii) Action of heat on insoluble compound C produces a gas which turns lime water turbid.

(iv) Compound D when warmed with dilute sulphuric acid gives a gas which turns acidified potassium dichromate solution green.

(b) Write balanced equations for action of heat on following compound:**[3]**

(i) Potassium chlorate _____

(ii) Sodium hydrogen carbonate _____

(iii) Copper nitrate _____

(c)

(i) *Name a substance which could be mixed with potassium chlorate so that it would decompose faster*

(ii) Describe all that you would see when copper nitrate is heated.

[3]

Question 3**(a)** Copy and complete the following table:**[5]**

ELEMENT	ATOMIC NUMBER	MASS NUMBER	NUMBER OF		
			PROTONS	NEUTRONS	ELECTRONS
Beryllium	4	9			
Fluorine	9			10	
Sodium				12	11
Aluminium		27	13		
Phosphorus		31			15

(b) The electronic structure (configuration) of Fluorine can be written as 2, 7.**[2]**

In a similar way give the electronic configuration of :

(i) Aluminium; _____.**(ii)** Phosphorus. _____.**(c)****[3]****(i)** Show the formation of carbon tetrachloride molecule using an electron 'dot and cross' diagram.**(ii)** State two differences you would expect to find between the properties of Carbon tetrachloride and Sodium chloride.

Question 4

- (a) The following statements are correct only under certain conditions. Rewrite each statement including the appropriate condition(s) underlined in your answer. [4]

For example:

Statement: Sodium chloride reacts with silver nitrate forming a precipitate of silver chloride.

Correct statement: Sodium chloride solution reacts with silver nitrate solution forming a precipitate of silver chloride.

- (i) Oxalic acid reacts with sulphuric acid to produce carbon monoxide and carbon dioxide.

- (ii) *Chlorine reacts with sodium hydroxide solution to produce sodium chlorate.*

- (iii) Copper and nitric acid react together producing nitrogen dioxide.

- (iv) *Sulphur dioxide is a bleaching agent.*

- (b) Write equations for the following reactions: [4]

- (i) *Formation of sodium chlorate from sodium hydroxide.*

- (ii) Production of nitrogen dioxide using copper.

- (iii) Carbon monoxide acting as a reducing agent.

- (iv) Sulphur dioxide acting as an oxidizing agent.

- (c) [2]

- (i) *How would you remove the carbon dioxide from a carbon dioxide and carbon monoxide mixture?*

- (ii) Why is copper not used to prepare hydrogen by the action of dilute hydrochloric acid or dilute sulphuric acid on the metal?

Question 5

(a) An acid of phosphorus has the following percentage composition: 2.47% hydrogen, 38.27% phosphorus, 59.26% oxygen. [4]

Find the empirical formula of this acid and its molecular formula, given that its relative molecular mass is 162. (H=1, O=16, P=31).

A

H

S

(b) Phosphorus has several allotropes. Name two other elements which also have allotropes. [2]

H

(c) The reaction between aluminium carbide and water takes place according to the following equation: $\text{Al}_4\text{C}_3 + 12\text{H}_2\text{O} \rightarrow 3\text{CH}_4 + 4\text{Al}(\text{OH})_3$ [3]

Calculate the volume of methane (CH_4), measured at s.t.p., released from 14.4 g of aluminium carbide by excess water. (C=12, Al=27)

H

U

E

(d) Write the equation for the action of heat on aluminium hydroxide. [1]

R

Question 6**(a)****(i)** Copy and complete the following table:

	Name of Product	Name of Catalyst	Approximate Temperature
Haber's Process			
Ostwald's Process			

(ii)

For the Haber's Process state the approximate pressure.

(iii)

How is the temperature maintained in the Ostwald's Process?

(b)

Write equation for the laboratory preparation of:

(i) Ammonia from ammonium chloride.**(ii)** Nitric acid from potassium nitrate.**(c)***Answer the following:***(i)***What is meant by the "fixation of nitrogen"?***(ii)***State two ways in which fixation of nitrogen occurs naturally*

Question 7

- (a)
- (i) Give the name and formula of the ore of zinc.
- (ii) Write equations for the following steps in extraction of zinc:
- (1) Roasting of the ore.

[5]

A

(2) Reduction of the zinc compound which is the product of the above reaction.

- (iii) *What, in addition to a zinc compound, is put into the blast furnace.*
- (iv) *State one large scale use of zinc.*

- (b)
- (i) What is the purpose of the Contact process?

[4]

- (ii) What two gases are combined during the Contact process?

- (iii) Name the catalyst used in the process.

- (c) Write the equation for the reaction between zinc and the final product of the Contact process.

[1]

U

E

V

R