Alternative No:

Index No: | 0 | 1 | 0 | 0 | 1 | 2 | | | | | |

Supervising Examiner's/Invigilator's initial:

Paper 2 (Chemistry) **Writing Time: $1\frac{1}{2}$ Hours**

Total Marks : 80

READ THE FOLLOWING DIRECTIONS CAREFULLY:

1. Do **not** write for the first **fifteen minutes**. This time is to be spent on reading the questions. After having read the questions, you will be given **one and a half hours** to answer all questions.
2. A list of **ATOMIC WEIGHTS** of some elements **for solving numerical problems** is given at the end of the question booklet.

3. Write the remaining seven digits of your **index number** in the space provided on the **top right hand corner of this cover page only**.
4. In this paper, there are **two** sections: **A** and **B**. Section **A** is compulsory. You are expected to attempt **any four** questions from Section **B.**

5. The intended marks for questions or parts of questions, are given in brackets [ ].
6. Read the directions to each question carefully and write **all** your answers in the space provided in the **question booklet** itself.

7. Remember to write **quickly** but **neatly**.
8. **Do not** remove or tear off any pages from the question booklet.

9. **Do not** draw lines or pictures **on** or **in** the question booklet to beautify it.
10. **Do not** leave the examination hall before you have made sure that you have answered all the questions.

For Chief Marker's and Markers' Use Only

Question Number															**Total**	**Chief Marker's Signature ↓**
Award																
Markers' initial →																

SECTION A (40 Marks)

Compulsory: To be attempted by all candidates.

Question 1

(a) Directions: Each question in this part is followed by four possible choices of answers. Choose the correct answer and write it in the space provided in the question booklet. **[15]**

(i) The elements of group IA are called

A halogens.
B earth metals.
C alkali metals.
D transition metals.

Answer:…….

(ii) The fountain experiment demonstrates a similar property of ammonia and hydrogen chloride gases. This property is the

A basic nature.
B acidic nature.
C neutral nature.
D extreme solubility.

Answer:…….

(iii) Which one of the following is an acid?

A KCl
B NaOH
C H_2CO_3
D $NaHSO_4$

Answer:…….

(iv) When a few drops of blue litmus solution are added to an unknown solution 'X', the colour of the blue litmus changes to red. What is the nature of the solution X?

A basic
B acidic
C neutral
D alkaline

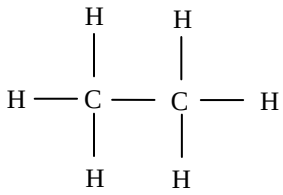
Answer:…….

(v) Hydrocarbons with double or triple bond are called

A alkenes.
B alkynes.
C saturated hydrocarbons.
D unsaturated hydrocarbons.

Answer:…….

(vi)



The diagram shown above is the structural formula of

A ethane.
B ethene.
C butane.
D methane.

Answer:……

(vii) The earthy impurities present in the ore is called

A slag.
B flux.
C gangue.
D dust particles.

Answer:……

(viii) The relative molecular weight of $MgSO_4$ is

A 60.
B 72.
C 120.
D 144.

Answer:……

(ix) The percentage composition of oxygen in $CuSO_4.5H_2O$ is

A 25.7%.
B 32.1%.
C 57.7%.
D 72.1%.

Answer:……

(x) Which one of the following ions will move towards the cathode during the electrolysis of copper sulphate solution?

A H^+
B OH^-
C Cu^{2+}
D SO_4^{2-}

Answer:……

(xi) The element present in Period 3 and Group 17 in the periodic table is

A bromine.
B chlorine.
C fluorine.
D iodine.

Answer:…….

(xii) The type of bond found in $MgCl_2$ is

A a covalent bond.
B a hydrogen bond.
C a coordinate bond.
D an electrovalent bond.

Answer:…….

(xiii) 'A colourless and poisonous gas has a foul smell of rotten eggs. It is found to be heavier than air and fairly soluble in water'. The gas described in the statements above

A SO_2.
B H_2S.
C NH_3.
D HCl.

Answer:…….

(xiv) Which one of the following will weigh the most?

A 1 mole of CO_2
B 1 mole of H_2O
C 1 mole of NH_3
D 1 mole of HCl

Answer:…….

(xv) The empirical formula of a compound is CH_2O. If the molecular weight of the compound is 60, its molecular formula will be

A C_2H_2O.
B $C_2H_2O_2$.
C $C_2H_4O_2$.
D $C_4H_8O_4$.

Answer:…….

(b) Fill in the blanks with appropriate words. **[6]**

(i) The atomic size of elements …….. across the period in the periodic table.

(ii) The number of lone pair of electrons present in a molecule of water is ……..

(iii) The molecular mass of a gas having vapour density 16 is ……..

(iv) The colour of the precipitate formed by the action of ammonium hydroxide on copper sulphate solution is ……..

(v) The number of molecules present in 2 moles of hydrogen gas is ……..

(vi) During the electrolytic refining of copper, the impure copper should be placed at the ……..

(c) ***Match each item in Column A with the most appropriate item in Column B. Rewrite the correct matching pairs in the spaces provided below.***

Column A	**Column B**
(i) Methyl alcohol	(a) light and strong
(ii) Vapour density	(b) decorative pieces
(iii) Aircraft parts	(c) antifreeze
(iv) Electroplating	(d) tough and heavy metal
(v) Electronic configuration	(e) atomic weight
	(f) $\frac{1}{2} \times$ molecular weight
	(g) atomic number
	(h) $2 \times$ molecular weight

……

……

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……

(d) Explain the following statements. **[6]**

(i) The metallic character of elements increases down a group in the periodic table.

……

……

……

……

(ii) Aluminium is widely used in making household items.

……

……

……

(iii) Nitric acid prepared in the laboratory is slightly yellow in colour.

……

……

……

(e) Rewrite the following statements by changing only the underlined words. Rewrite the correct statements. **[3]**

(i) The precipitate formed on adding NaOH solution to $FeCl_3$ solution is <u>NaCl.</u>

……

……

……

(ii) The device in which electrolysis is carried out is called <u>electro-chemical cell.</u>

……

……

(iii) Any base reacts with dilute HNO_3 to form a <u>metallic carbonate</u> and water.

……

……

(iv) <u>Formaldehyde</u> is formed by the oxidation of ethane at 350-500ºC.

……

……

(v) The action of conc. H_2SO_4 on copper turnings will lead to the formation of <u>SO_3</u> gas.

……

……

……

(f) What volume of hydrogen will combine with 32 L of nitrogen to form ammonia according to the following equation, $N_2 + 3H_2 \rightarrow NH_3$? **[3]**

SECTION B (40 Marks)

Attempt any four questions

Question 2

(a) Study the part of the periodic table given below and answer the questions that follow. The letters shown in the table are not the symbols of elements. **[4]**

A																	**B**
C	**D**												**E**	**F**	**G**	**H**	**I**	**J**
K	**L**												**M**	**N**	**O**	**P**	**Q**	**R**
S	**T**																	

(i) Which of the two elements, K or N has more ionization potential?

……

(ii) Name a non-metal from the above table.

……

(iii) What happens to the electronegativity on moving from left to right in the periodic table?

……

(iv) What type of chemical bond will exist in the compound formed by elements L and Q in the above table?

……

(b) Name the following. **[4]**

(i) An oxide which is amphoteric in nature.

……

(ii) The positive ion formed by acids when dissolved in water.

……

(iii) The drying agent used to dry HCl gas during its laboratory preparation.

……

(iv) A series of hydrocarbons in which the consecutive member differs by a CH_2 group.

……

(c) Calculate the number of moles in a drop of water weighing 9 grams. **[2]**

Question 3

(a) Complete the following equations. **[4]**

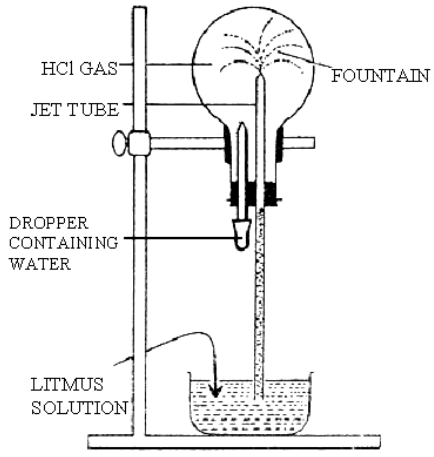
(i) $C_2H_6 + Cl_2 \xrightarrow{\text{diffused sunlight}} \ldots\ldots\ldots\ldots + HCl$

(ii) $CaO + SiO_2 \longrightarrow \ldots\ldots\ldots\ldots$

(iii) $HCl + NaOH \longrightarrow \ldots\ldots\ldots\ldots + H_2O$

iv) $MgCl_2 + 2NH_4OH \longrightarrow 2NH_4Cl + \ldots\ldots\ldots\ldots$

(b) Study the diagram given below and answer the questions that follow.



(i) What does the experiment given above demonstrate? **[1]**

……

……

……

(ii) What would be the colour of the fountain? Why? **[2]**

……

……

……

(iii) How is HCl gas collected during its laboratory preparation? **[1]**

……

……

(c) State **two** uses each of the following. **[2]**

(i) bronze

……

……

……

(ii) ammonia gas

……

……

……

Question 4

(a) Give reasons for the following. **[5]**

(i) Elements in the same group have similar chemical properties, whereas the elements in the same period do not.

……

……

……

……

……

(ii) Ammonia is collected by the downward displacement of air, whereas HCl ga
is collected by the upward displacement of air.

……

……

……

(iii) Zinc is amphoteric in nature but iron is not.

……

……

……

(iv) 2g of hydrogen and 32g of oxygen contain the same number of molecules.

……

……

……

(v) The atomic size of sodium is bigger than that of lithium.

……

……

(b) Copper reacts with concentrated sulphuric acid according to the following equation.

$Cu + 2H_2SO_4 \longrightarrow CuSO_4 + 2H_2O + SO_2$

If 127g of copper is used, calculate the: **[3]**

(i) weight of copper sulphate formed,

(ii) volume of SO_2 liberated at the same time.

(c) Draw the structural diagrams for the formation of the following compounds.

(i) NaCl

(ii) H_2O

Question 5

(a) A substance on analysis gave the following percentage compositions:

Na = 43.4%, C = 11.3%, O = 45.35%.

(i) Calculate the empirical formula of the compound. **[2]**

(ii) If the molecular mass of the compound is 106, find its molecular formula. **[2]**

(b) Define the following.

(i) Periodicity of elements

……

……

……

……

(ii) Calcination

……

……

……

……

(iii) Ionization

……

……

……

……

(iv) Isomerism

……..

……..

……

……

(c) Give reasons for the following statements. **[2]**

(i) Concentrated H_2SO_4 can be used to dry SO_2 gas but not NH_3 gas.

……

……

……

(ii) Delicate materials are bleached by SO_2 but not by chlorine.

……

……

……

Question 6

(a) Give an example each for the following.

(i) an acid salt

……

(ii) a normal salt

……

(iii) a metal nitrate which gives the corresponding metal on heating

……

(iv) an alkali metal

……

(b) Answer the following questions with regard to extraction of iron. **[4]**

(i) Name an ore of iron.

……

(ii) Which substance, carbon or calcium carbonate, is used to remove the gangue?

……

(iii) Write the reaction that takes place at the top of the blast furnace.

……

(iv) Why is iron extracted by reduction method and not by electrolytic process?

……

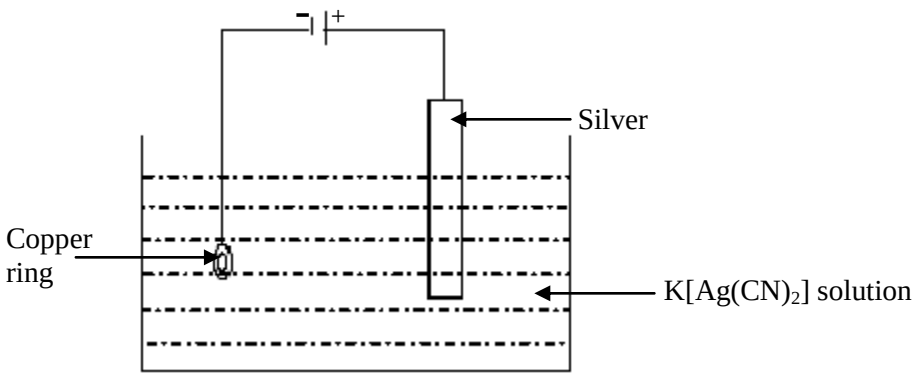
……

……

(c) Calculate the percentage composition of $Ca(NO_3)_2$. **[2]**

Question 7

(a) Study the diagram below and answer the questions that follow.



(i) What does the above diagram show?

……..

……

(ii) Write the reaction at the cathode.

……

……

(iii) Write the reaction at the anode.

……

……

(iv) What happens to the size of the anode during the above process?

……

……

……

……

……

(b) (i) In an experiment to show the action of alkalis on a salt solution, Sonam took two test-tubes containing salt solutions A and B. On adding a little amount of ammonium hydroxide to both the test-tubes, a gelatinous white precipitate formed. When an excess of ammonium hydroxide was added to both the test-tubes the precipitate formed in solution A dissolved, whereas the precipitate formed in solution B did not. Identify the salt solutions A and B. **[2]**

……

……

……

……

……

(ii) Distinguish between Mg^{2+} and Pb^{2+} ions using sodium hydroxide solution. **[1]**

……

……

……

……

(iii) Explain the effect of heat on sodium nitrate. **[1]**

……

……

……

……

(c) Write the molecular formula of the following compounds. **[2]**

(i) dichloro methane

(ii) ethanol

……

……

Atomic weights of elements

Elements	**Atomic weights**	**Elements**	**Atomic weights**
H	**1**	K	**39**
C	**12**	Ca	**40**
N	**14**	Cr	**52**
O	**16**	Fe	**56**
Na	**23**	Cu	**63.5**
Mg	**24**	Zn	**65**
S	**32**	Br	**80**
Cl	**35.5**	Pb	**207**

for Rough Work