Alternative No:

Index No: | 0 | 1 | 0 | 0 | 8 | | | | | | |

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 reading the questions. After having read the questions, you will be given **one and a half hours** to answer all questions.
2. Write the remaining seven digits of your **index number** in the space provided on the **top right hand corner of this cover page only**.
3. 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.**
4. The intended marks for questions or parts of questions, are given in brackets [ ].
5. Read the directions to each question carefully and write **all** your answers in the space provided in the **question booklet** itself.
6. Remember to write **quickly** but **neatly**.
7. **Do not** remove or tear off any pages from the question booklet.
8. **Do not** draw lines or pictures **on** or **in** the question booklet to beautify it.
8. **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 →																

This booklet contains 20 pages.

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 correct value of Avagadro's number is
A 6023×10^{23}.
B 602.3×10^{23}.
C 60.23×10^{23}.
D 6.023×10^{23}.

Answer:…….

(ii) A compound which yields hydrogen ions when dissolved in water is called
A an alkali.
B an acid.
C a base.
D a salt.

Answer:…….

(iii) Which of the following series of metals given below shows the arrangement of metals in their decreasing order?
A Al, Zn, K, Mg, Na
B K, Na, Mg, Al, Zn
C Mg, K, Na, Al, Zn
D Zn, Al, Mg, Na, K

Answer:…….

(iv) In the Periodic table, atomic size in the group increases from top to bottom because the
A nuclear charge remains same.
B number of shells decreases.
C number of shells increases.
D nuclear charge increases.

Answer:…….

(v) A gas that liberates dense white fumes when mixed with hydrogen chloride gas is
A nitrogen.
B ammonia.
C hydrogen.
D nitrogen dioxide.

Answer:……

(vi) *A*, *B* and *C* are the elements of a Dobereiner's triads. If the atomic mass of *A* is 35.5 and that of *C* is 127, the atomic mass of *B* is
A 81.25.
B 82.25.
C 83.25.
D 84.25.

Answer:……

(vii) Pure nitric acid is colourless but the nitric acid obtained from the laboratory is slightly yellow coloured. The yellow colour is due to the presence of
A carbon monoxide.
B nitrogen dioxide.
C carbon dioxide.
D sulphur dioxide.

Answer:……

(viii) The allotrope of sulphur obtained by pouring very hot liquid sulphur into cold water is
A monoclinic sulphur.
B prismatic sulphur.
C rhombic sulphur.
D plastic sulphur.

Answer:……

(ix) When ammonium hydroxide is added to a solution *X*, a white precipitate is formed. This white precipitate does not dissolve in excess of ammonium hydroxide. Therefore, the cation present is
A aluminium.
B magnesium.
C lead.
D zinc.

Answer:……

(x) The catalyst used to convert ethene to ethane is

A iron.
B nickel.
C cobalt.
D platinum.

Answer:……

(xi) The metal that can be extracted by electrolytic process is

A aluminium.
B copper.
C lead.
D iron.

Answer:…….

(xii) When an aqueous solution of sodium hydroxide is added to a solution of ferrous sulphate, a precipitate of ferrous hydroxide is formed. The colour of this precipitate is

A reddish brown.
B chalky white.
C green.
D blue.

Answer:…….

(xiii) Which of the following organic compounds contains a double bond between two carbon atoms?

A ethane
B ethene
C ethyne
D methane

Answer:…….

(xiv) The volume of oxygen evolved when 18 gms of water is electrolysed at STP is

A 11.2 litres.
B 11.0 litres.
C 10.2 litres.
D 10.0 litres.

Answer:…….

(xv) Which of the following is a use of sulphur dioxide?

A refining petroleum
B making gun powder
C bleaching delicate articles
D sterilizing of drinking water

Answer:……

(b) Fill in the blanks by using appropriate terms. **[6]**

(i) Electrovalent compounds are generally soluble in …….

(ii) The process of decomposition of an electrolyte by a passage of electric current is called……..

(iii) The non-metal that can form cation like metals is…….

(iv) The mineral acid used in making soft drinks is …….

(v) The substance used for sterilisation of drinking water is ……..

(vi) Elements of group I A are called ……...

(c) Correct the following statements and rewrite the correct statements in the space provided. **[6]**

(i) Anhydrous copper sulphate crystals are dehydrated by sulphuric acid.

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(ii) In bright sunlight, chlorine directly takes away hydrogen from water liberating nitrogen.

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(iii) Soluble salts are prepared by precipitation method.

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(iv) 32 gm of oxygen and 1gm of hydrogen occupy the same volume at STP.

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(v) The number of protons or electrons in an atom indicates the mass number.

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(vi) Atomic size increases while moving from left to right in a period.

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(d) Match each item under Column A with that which is most appropriate in Column B. You must rewrite the correct matching pairs in the space provided below. **[6]**

Column A	**Column B**
1. Oxygen	a) simplest ratio
2. Phenolphthalein	b) Ostwald's process
3. Emperical formula	c) diatomic molecule
4. Alkanes	d) pH 7
5. Distilled water	e) substitution reaction
6. Nitric acid	f) remains colourless in acid solution
	g) addition reaction
	h) turns pink in acidic solution

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(e) Answer the following questions:

(i) Zinc (II) nitrate decomposes according to the equation given below:

$2Zn(NO_3)_2 \rightarrow 2ZnO + 4NO_2 + O_2 \uparrow$

(At. Wt.: Zn = 65, N = 14, O = 16)

1. Find the weight of zinc oxide formed when 37.8 g of zinc nitrate is heated. **[2]**

2. Find the volume of nitrogen dioxide evolved at the same time. **[1]**

(ii) Use the table below to answer the questions that follow:

Element	**Mass number**	**Atomic number**
A	40	20
B	19	9
C	7	3
D	16	8
E	14	7

1. Which of the element has seven protons? **[½]**

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2. Which of the element is a metal? **[½]**

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(iii) Aqueous copper (II) sulphate was electrolysed in the laboratory using platinum electrodes.

1. Name the product formed at the cathode. **[½]**

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2. Name the product formed at the anode. **[½]**

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(iv) Define the following terms:

1. Catalyst **[1]**

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2. Alkali **[1]**

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SECTION B (40 Marks)

Attempt any four questions

Question 2

(a) A hydrocarbon has the following percentage composition:

H = 2.2%, C = 26.6% and O = 71.2% (At. Wt.: H = 1, C = 12, O = 16)

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

(ii) If the molecular weight of the compound is 90, find the molecular formula.

(b) Give the balanced equations for the following reactions: **[2]**

(i) Sodium hydroxide solution is added to magnesium sulphate.

……

(ii) Ammonium hydroxide solution is added to zinc sulphate.

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(c) Study the equation given below and answer the questions that follow.

$3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 4H_2O + 2NO$

1. Calculate the mass of copper needed to react with 126 gm of HNO_3. **[2]**

2. Calculate the volume of nitric oxide produced at STP at the same time.

(d) Why is antacid taken when you suffer from stomach ache? **[1]**

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Question 3

(a) The following questions are related to the electrolysis of aqueous solution of copper sulphate using copper electrodes.

(i) Write the equations for the reactions that takes place at the cathode and anode. **[2]**

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(ii) Copper sulphate solution is blue in colour and the blue colour does not fade when the copper electrodes are used. Explain. **[1]**

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(iii) What will happen to the colour of copper sulphate solution if platinum electrodes are used instead of copper electrodes?

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(iv) State *two* industrial applications of electrolysis. **[1]**

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(b) (i) Why is hydrochloric acid considered a strong acid? **[1]**

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(ii) Explain the term esterification with an example. **[2]**

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(iii) State Avogadro's Law. **[1]**

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(iv) Distinguish between concentrated and dilute acid in the table given below.

Concentrated acid	Dilute acid

Question 4

(a) Complete the following equations: **[2]**

(i) $Fe - 3e^- \rightarrow$ ……

(ii) $N + 3\ e^- \rightarrow$ ……

(iii) $Na - \ldots\ldots \rightarrow Na^+$

(iv) $Ca^{++} + 2e^- \rightarrow$…….

(b) During the manufacture of iron, iron ore, coke, limestone and hot air are put into the blast furnace.

(i) Name the most common ore of iron. Give its chemical formula. **[2]**

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(ii) What is the purpose of using limestone? **[1]**

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(iii) Name *two* substances which separate out at the bottom of the blast furnace. **[1]**

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(c) The equations given below are incomplete. They represent the reactions taking plac during the extraction of zinc from zinc blende. Complete and balance the equations.

(i) ZnS + ……. → ZnO + ……

(ii) ZnO + …….. $\rightleftharpoons$ Zn + ……..

(iii) Aluminium has a wide range of utility over other metals. Why? **[2]**

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Question 5

(a) (i) What do you observe when chlorine gas is passed through molten sodium? **[1]**

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(ii) What do you observe when a jet of burning hydrogen is introduced in a jar of chlorine? **[1]**

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(b) Write a balanced chemical equation for the preparation of hydrogen chloride from sodium chloride. **[2]**

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(c) An element *X* can be represented by $_{17}X^{37}$. Study the element carefully and answer the following questions:

(i) Write the electronic configuration of element X. **[1]**

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(ii) What is the valency of X? **[1]**

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(iii) Predict the group and period to which it belongs. **[1]**

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(iv) Is X a metal or a non metal? Why? **[2]**

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(v) Write the formula of the compound formed when X combines with Y whose valency is 2. **[1]**

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Question 6

(a) Distinguish between: **[3]**

Metallic conductors	**Electrolytic conductors**

(b) Which one of the reactions given below is an example of Substitution reaction? Why

(i) $CH_4 + 4Cl_2 \rightarrow CCl_4 + 4HCl$

(ii) $C_2H_2 + Cl_2 \rightarrow C_2H_2Cl_2$

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(c) (i) What will you observe when ethyne is bubbled through a solution of bromine in carbon tetrachloride? **[2]**

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(ii) Name the hydrocarbons represented by the general formula given below: **[1]**

1. $C_n H_{2n-2}$

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2. $C_n H_{2n+1}OH$

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(d) Complete and balance the following equations: **[2]**

(i) $2NH_3 + H_2SO_4 \rightarrow$ ……..

(ii) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 +$ ……

Question 7

(a) Give a test to identify the following compounds:

(i) Nitric acid **[1]**

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(ii) Ammonia gas **[1]**

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(b) (i) During the preparation of nitric acid in the laboratory only glass apparatus must be used. Why? **[1]**

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(ii) Write *two* uses of ammonia. **[1]**

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(iii) Vulcanisation of rubber is a boon to the tyre industry. Justify this statement. **[2]**

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(c) Calculate the relative molecular mass or molecular weights of the following compou

[At.wt.: N = 14, H = 1, C = 12, O = 16, S = 32]

(i) Urea [NH_2CONH_2]

(ii) Ammonium sulphate [$(NH_4)_2SO_4$]

(iii) Water [H_2O]

(d) Sulphur dioxide dissolves in water to form an acid. Name the acid formed. **[1]**

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for Rough Work

for Rough Work