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Index No:

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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. Empirical 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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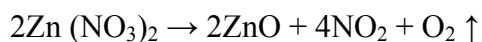
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(e) *Answer the following questions:*

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



(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]

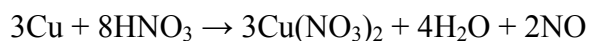
- (i) Sodium hydroxide solution is added to magnesium sulphate.

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- (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.



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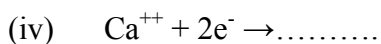
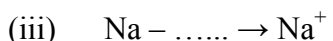
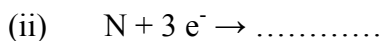
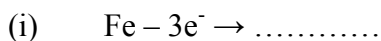
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(iv) Distinguish between concentrated and dilute acid in the table given below.

Concentrated acid	Dilute acid

Question 4

(a) Complete the following equations: [2]



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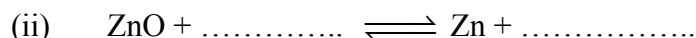
(ii) What is the purpose of using limestone? [1]

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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 place during the extraction of zinc from zinc blende. Complete and balance the equations.



(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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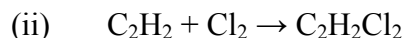
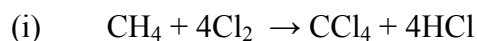
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Question 6

(a) Distinguish between: [3]

Metallic conductors	Electrolytic conductors

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



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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]

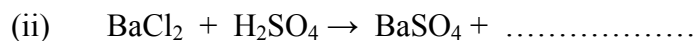
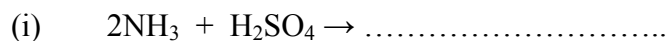


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(d) Complete and balance the following equations: [2]



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

(i) Urea [NH_2CONH_2]

(ii) Ammonium sulphate [$(\text{NH}_4)_2\text{SO}_4$]

(iii) Water [H_2O]

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

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