

ATUL VIDYALAYA
SECOND PRELIMINARY EXAMINATION 2012-13
Science paper 2 –**CHEMISTRY [TYPE B]**

STD: X
DATE: -11-12
SESSION: I

TIME: 1 ½ Hrs
MM: 80

Answer all the questions from Section A and four questions from Section B. You will not be allowed to write during first 10 minutes. This time is to be spent in reading the question paper. All working including rough work should be done on the same sheet. The intended marks for questions or parts of questions are given in brackets.

SECTION –I (40 marks)
(Answer all the questions)

Question 1

- (a) Write balanced equations for the following reactions: [5]
- (i) Aluminium powder is warmed with hot and concentrated caustic soda solution.
 - (ii) Concentrated nitric acid is added to copper turnings kept in a beaker.
 - (iii) Red lead (tri lead tetroxide) is warmed with concentrated hydrochloric acid
 - (iv) MnO_2 is heated with conc. HCl.
 - (v) Excess of a conc. solution of ammonia is poured in a jar of chlorine
- (b) For parts (b) (i) to (x), select the correct answer from the choices A, B, C, D which are given. Write down only the letter corresponding to the correct answer. [10]
- (i) Which of the following elements has the greatest electron affinity?
A. Ca B. Cl C. Sr D. I
 - (ii) Dative bond or coordinate bond is present in the molecule
A. SO_3 B. BF_3 C. NH_3 D. HF
 - (iii) Sulphuric acid is a dibasic acid. Hence it forms
A. Acidic salt B. basic and acidic salt C. acidic and normal salt D. double salt
 - (iv) The salt which in solution gives a pale green precipitate with sodium hydroxide solution and a white precipitate with barium chloride solution is
A. Iron(II) chloride B. Iron(III) chloride C. Iron(II) sulphate D. Iron(III) sulphate.
 - (v) Molar volume of a gas is the volume occupied by
A. 1g of the gas B. 22.4 g of the gas C. 22.4 L of the gas at S.T.P D. 1L of the gas at S.T.P
 - (vi) Oxidation involves
A. Gain of electrons B. loss of electrons C. formation of negative ion D. formation of positive ion.
 - (vii) During electroplating, the best conditions for a good deposit are
A. a direct small current for longer time and higher concentration of metal ions in the electrolyte
B. a direct large current for smaller time and of metal ions in the electrolyte
C. a small alternating current for longer time and smaller concentration of metal ions in the electrolyte
D. a large alternating current for smaller time and higher concentration of metal ions in the electrolyte.
 - (viii) The sulphides are generally concentrated by
A. Gravity separation B. froth flotation process C. magnetic separation D. liquation
 - (ix) Catalytic oxidation of ammonia in presence of platinum at $800^\circ C$ gives
A. NO_2 B. NO C. N_2O D. N_2O_5

- (x) Pick out the alkane which differs from other members of the group.
A. 2,2 –Dimethyl propane B. Pentane C. 2-Methylbutane D. 2,2-Dimethyl butane

(c) Choose the letters A,B,C or D to match the descriptions to (i) to (vi): [6]

A. Ammonia B. Hydrogen chloride C. Hydrogen sulphide D. Sulphur dioxide

- (i) The gas turns moist red litmus paper blue.
(ii) This gas turns acidified potassium dichromate solution green.
(iii) This gas can be oxidised to sulphur.
(iv) This gas can be obtained by the reaction between copper and concentrated sulphuric acid.
(v) When this gas is bubbled through copper sulphate solution, a deep blue coloured solution is formed.
(vi) This gas gives a white precipitate when reacted with silver nitrate solution acidified with dilute nitric acid.

(d) State what do you observe when: [4]

- (i) Neutral litmus solution is added to an alkaline solution.
(ii) Lead nitrate solution and sodium chloride solution are mixed.
(iii) Ethene is bubbled through a solution of bromine in tetra chloromethane (carbon tetrachloride).
(iv) Ammonium hydroxide is added to iron (III) sulphate.

(e) When heated potassium permanganate decomposes according to the following equation: [5]



- (i) Solid potassium permanganate was heated in a test tube. After collecting one litre of oxygen at room temperature, it was found that the test tube had undergone a loss in mass of 1.32g. If one litre of hydrogen under same conditions of temperature and pressure has a mass of 0.0825g, calculate the relative molecular mass of oxygen.
(ii) Given that the molecular mass of potassium permanganate is 158, what volume of oxygen (measured at room temperature) would be obtained by the complete decomposition of 15.8 g of potassium permanganate?(Molar volume at room temperature is 24 litres).

(f) Complete each of the following sentences using the correct words from those given in the brackets at the end of each sentence. [5]

- (i) ----- contains a double bond between two carbon atoms.(ethane, ethane, ethyne).
(ii) The number of atoms present in one -----(mole/molecule) of an element is called its -----(acidity/atomicity).
(iii) ----- decreases across the period from sodium to chlorine(atomic size, electronegativity, ionisation potential).
(iv) Electrolysis is the passage of -----electricity/electrons)through a liquid or a solution accompanied by a -----(physical/chemical) change.
(v) Ionic compounds have -----melting points due to -----attractive forces(high, low, strong, weak).

(g) [5]

- (i) What is the name given to the energy released when an atom in its isolated gaseous state accepts an electron to form an anion?
(ii) State Gay-Lussac's law of gaseous volumes.
(iii) Define ionization potential.

- (iv) What type of bonding will be present in the oxide of the element with atomic number 17?
 (v) Give the formula of an acidic salt.

SECTION – II (40 MARKS)

Answer any four questions from this section

Question 2

- (a) The electronegativities (according to Pauling) of the elements in Period 3 of the Periodic Table are as follows with the elements arranged in alphabetical order:

Al	Cl	Mg	Na	P	S	Si
1.5	3.0	1.2	0.9	2.1	2.5	1.8

- (i) Arrange the elements in the order in which they occur in the periodic table from left to right. (The group 1 element first, followed by the group 2 element and so on, up to group VII A(17))
 (ii) Choose the word from the brackets which correctly completes each of the following statements:
 1. The element below sodium in the same group would be expected to have -----(lower/higher) electronegativity than sodium and the element above chlorine would be expected to have ----- (lower/higher) ionization potential than chlorine.
 2. On moving from left to right in a given period, the number of shells (remains the same/increases/decreases).
 3. On moving down a group, the number of valence electrons (remains the same/increases/decreases). [6]

- (b) Element X is a metal with valency 2.
 Element Y is a non-metal with a valency 3.

- (i) Write equations to show how X and Y form ions.
 (ii) If Y is a diatomic gas, write the equation for the direct combination of X and Y to form a compound
 (iii) If the compound formed between X and Y is melted and an electric current passed through the molten compound, the element X will be obtained at the ----- and Y at the ----- of the electrolytic cell. (Provide the missing words) [4]

Question 3

- (a) Choosing only substances from the list given in the box below, write equations for the reactions which you would use in the laboratory to obtain: [5]

- (i) Sodium sulphate (ii) copper sulphate (iii) iron (II) sulphate (iv) zinc carbonate

Dilute sulphuric acid	Copper	Copper carbonate
	Iron	Sodium carbonate
	Sodium	
	Zinc	

- (b) The following table shows the tests a student performed on four aqueous solutions A, B, C and D. Write down on your answer sheet the observations (i) to (iv) that were made. [5]

Test	Observations	Conclusions
(i) To solution A, barium chloride solution and dilute hydrochloric acid were added	_____	A contains SO_4^{2-} ions
(ii) To solution B sodium hydroxide solution was added slowly till in excess.	_____	B contains Fe^{3+} ions
(iii) To the solution C ammonium hydroxide was added slowly till in excess.	_____	C contains Cu^{2+} ions
(iv) To solution D silver nitrate solution and dilute nitric acid were added	_____	D contains Cl^- ions.

Question 4

- (a) (i) Write down the words or phrases from the brackets that will correctly fill in the blanks in the following sentences:
- Pure water consists almost entirely of -----(ions/molecules)
 - We can expect that pure water ----- (will/will not) normally conduct electricity.
- (ii) To carry out the so called "electrolysis of water", sulphuric acid is added to water. How does the addition of sulphuric acid produce a conducting solution?
- (iii) Copy and complete the following : With platinum electrodes hydrogen is liberated at the ----- and oxygen at the ----- during the electrolysis of acidified water.
- (iv) When the electrolysis of acidified water is carried out:
- What is the ratio of the volume of hydrogen produced to the volume of oxygen?
 - Give the equation for the discharge of ions at the cathode. [7]
- (b)
- What kind of particles will be found in a liquid compound which is a non-electrolyte?
 - What ions must be present in a solution used for electroplating a particular metal?
 - Explain how electrolysis is an example of redox reaction. [3]

Question 5

- (a) Separate portions of a solution of hydrogen chloride in water are added to the different substances when a gas is evolved. Complete the table given below by writing the gas evolved in each case and its odour. [4]

Sr. No	Substances added	Gas evolved	Odour
1.	Calcium carbonate	_____	_____
2.	Magnesium ribbon	_____	_____
3.	Manganese(IV) oxide	_____	_____
4.	Sodium sulphide	_____	_____

- (b) A flask contains 6.4g of sulphur dioxide. Calculate the following: [6]
- The moles of sulphur dioxide present in the flask.

- (ii) The number of molecules of sulphur dioxide present in the flask.
- (iii) The volume occupied by 6.4 g of sulphur dioxide at S.T.P (S=32,O=16)

Question 6

- (a) Compare the properties of a typical metal and a non-metal on the basis of the following: [4]
- (i) Electronic configuration
 - (ii) Nature of the oxides
 - (iii) Oxidising or reducing action
 - (iv) Conductivity of heat and electricity
- (b) Write the equations for the following reactions: [3]
- (i) Dilute hydrochloric acid and sodium thio sulphate
 - (ii) Dilute sulphuric acid and sodium sulphide
 - (iii) Dilute nitric acid and copper
- (c) Give reasons for the following: [3]
- (i) Ammonia cannot be collected over water.
 - (ii) Commercial nitric acid is yellow in colour
 - (iii) Concentrated H_2SO_4 is kept in air tight bottles.

Question 7

- (a) [6]
- (i) Write the general formula for a saturated hydrocarbon and give one example of a saturated hydrocarbon with its structural formula.
 - (ii) Ethylene forms an addition product with chlorine. Name this addition product and write its structural formula.
 - (iii) Name a solid which can be used instead of concentrated sulphuric acid to prepare ethylene by the dehydration of ethanol.
 - (iv) Name a reagent which can be used to distinguish between ethene and ethyne
 - (v) Name a hydrocarbon which will give red precipitate with ammoniacal cuprous chloride
 - (vi) Name a compound which will give acetylene gas when treated with water.
- (b) Write balanced equations for the preparation of the following: [4]
- (i) Ethene from ethanol
 - (ii) Ethyne from calcium carbide
 - (iii) Ethane from sodium propionate
 - (iv) Ethanoic acid from ethane.
