ATUL VIDYALAYA
SECOND PRELIMINARY EXAMINATION 2012-13
CHEMISTRY-PAPER-I (THEORY)

STD-XII **MM-:70**
DATE-//12 **TIME-:3HRS**
SESSION – I/II

(*Candidates are allowed additional 15 minutes for only reading the paper. They must NOT start writing during this time*)

Answer* all *questions in Part I and six questions from Part II, choosing* two *questions from Section A, two from Section B and two from Section C.All working, including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer. The intended marks for questions or parts of questions are given in brackets [ ].Balanced equations must be given wherever possible and diagrams where they are helpful. When solving numerical problems, all essential working must be shown. In working out problems use the following data: Gas Constant R = 1.987 cal deg-1 mol-1 = 8.314 JK-1 mol-1 = 0.0821 dm3 atm K-1mol-11 l atm = 1 dm3 atm = 101.3 J. 1 Farday = 96500 Coulombs.

PART – I

(ANSWER ALL QUESTIONS)

Question 1

(a) Fill in the blanks choosing from the following: [5]

(Oxidizing,one,less,bleaching,amole,alkaline,second,planar,more,reducing,three,acidic, tetrahedral,trogonal bipyramidal)

i) Liquids as compared to solids have _____ entropy.

ii) Passage of one faraday of electricity means flow of _____ of electrons.

iii) Hydrolysis of ethyl acetate in _____medium is a _____order reaction.

iv) The shape of PCl5 is _____.

v) A triple bond contains _____ sigma and _____ pi bonds.

(b) Choose the correct answer from the alternatives given: [5]

(i) Azeotropic mixtures are:

(1) Ideal solution (2) Homogeneous solution

(3) Heterogeneous solution (4) Non-Ideal solution

(ii) Biuret test is given by :

(1) Urea (2) Proteins

(3) Peptides (4) All

(iii) Which of the following gives a white precipitate with mercuric chloride:

(1)Formic acid (2) Acetic acid

(3) Oxalic acid (4) Lactic acid

(iv) Benzoin condensation takes place between :

(1) An aromatic aldehyde and aromatic ketone

(2) An aromatic aldehyde and aliphatic aldehyde

(3) Aromatic ketone and aliphatic ketone

(4) Aromatic aldehydes only.

(v) Substances added to ores to remove the impurities is known as:

(1) Flux (2) Catalyst

(3) Gangue (4) Slag

(c) Correct the following statements: [5]

(i) Lowering of vapor pressure of solution is a colligative property.

(ii) A cubic crystal like NaCl possesses a total of 32 elements of symmetry.

(iii) Fluorine shows a maximum covalency of 7.

(iv) Matte and blister copper are impure forms of copper.

(v) In ammonia molecule the nitrogen atom is sp^2 hybridized and the shape of the molecule is trigonal planar.

(d) Match the following: [5]

A		B
i)	Faraday	(a) methanol
ii)	Fermentation	(b) Glucose
iii)	Water gas	(c) ethanol
iv)	Wohler	(d) electrolysis
v)	Monosaccharide	(e) urea

PART II

(Answer six questions choosing two from Section A, two from Section B and two from Section C)

SECTION A

(Answer any two questions)

Question 2 [3+3+2+2]

(a) The freezing point of a solution of 0.321 g of solute in 11.2 g of benzene is 278.115K.The freezing point of pure benzene is 278.40 K and its molecular depression of freezing point per 100 g of solvent is 51.2.Calculate the molecular mass of solute.

(b) Calculate mole fraction of methanol (CH_3OH) in a solution containing 100g of water and 30g methanol.

(c) Write three differences between crystalline and amorphous solids.

(d) Explain the following terms with reference to solids:

(i) CCP

(ii) FCP

Question 3 [4+2+4]

a) i) Calculate the maximum work done in expanding 16g oxygen at 300K and occupying volume of 5 dm^3 isothermally until the volume becomes 25dm^3.

ii) Why is the efficiency of an engine less than one?

b) Define Gibbs Free energy and give the mathematical representation of free energy.

c) i)What is Arrhenius equation. How can it be used graphically to calculate the energy activation for a reaction.

ii) Calculate the number of atoms in a f.c.c unit cell.

Question 4 **[4+2+2+2]**

a) i) A white precipitate of Calcium oxalate dissolves on adding hydrochloric acid but white precipitate of Barium sulphate does not dissolve on adding hydrochloric acid.Explain.
ii) What will be the pH of 1.0 N HCl,1.5 N HCl solutions?

b) Calculate the change in pH of one litre buffer solution containing 0.1 mole each of NH3 and NH4Cl upon addition of
i) 0.02 mole of dissolved HCl gas
ii) 0.02 mole of dissolved NaOH
Assume no change in volume ($KNH_3 = 1.8 \times 10^{-5}$)

c) Two metallic elements A and B have following standard oxidation potentials :
A= +0.40 V, B= - 0.90 V
What would you expect to occur if element A is added to an aqueous solution of salt of B.Give reason for your answer.

d) Draw energy level diagram for O_2 and predict its stability and magnetic behavior.

SECTION B
Answer any* two *questions

Question 5 **[5]**

Using valence bond theory of complexes explain the geometry and magnetic nature of $[COF_6]^{3-}$

Question 6 **[5]**

a) What happens when
i)Br_2 is treated with water in presence of sunlight.

ii) Phosphorous is boiled with an aqueous solution of alkali .

iii) Iodine reacts with caustic soda solution.

iv) Flourine passes through a conc. Solution of sodium hydroxide.

v) Silicon reacts with steam .

Question 7

(a) How can crystalline sodium thiosulphate be prepared starting from sulphur ? What particular property of sodium thiosulphate is responsible for its use as an antichlor in the textile industry? [2]

(b) Write balanced equations for each of the following reactions: [3]

(i) Fluorine and dilute sodium hydroxide.

(ii) Ozone and hydrogen sulphide.

(iii) Hydrogen peroxide and sodium hydroxide

SECTION C

(Answer any two questions)

Question 8 **[10]**

(a) How can the following conversions be brought about?
(i) Methyl bromide to ethylamine
(ii) Ethyl amine to ethanol
(iii)Urea to biuret
(iv)Formaldehyde to urotropine
(v)Acetaldehyde to lactic acid

Question 9 **[10]**

Write balanced equations:

(i) Acetaldehyde reacts with dilute alkali
(ii) Phenol is trated with conc.HNO3 in presence of concH2SO4.
(iii) Benzaldehyde is treated with conc.alkali
(iv)Benzoic acid is heated with soda lime

(v) Draw the isomers of a compound with the molecular formula $C_4H_4O_4$. Name the isomers.

Question 10 **[10]**

a) Explain the following named reactions:

i) Clemmensen's reaction
ii) Benzoin condensation
iii) Hoffmann's degradation
iv) Saponification

b) What are amines? How are they classified? How will you distinguish between CH_3CH2CH_2NH2 and CH3CH2NHCH$_3$.

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