GIIT PROFESSIONAL COLLEGE

(Affiliated to KOLHAN UNIVERSITY, Chaibasa)

Question Bank		**Course** :	**B.Sc. IT – 1st Year**
Subject Code :	**ITS02**	**Subject** :	**CHEMISTRY**

All questions carry equal marks.

Inorganic Chemistry

1. a) Explain the postulates of Bohr's theory of atomic structure. What are its limitations?
   b) What are spectral lines of Hydrogen? Explain it in light of Bohr's theory.
2. Write short notes on:
   a) Aufban Principle
   b) Pauli's Exclusion Principle
   c) Hund's rules of maximum multiplicity
   d) Shielding effect
   e) Effective nuclear charge
   f) Van – der Waal's radii
   g) Electron affinity
3. What are important ore of tin? How is Tin extracted from its main ore? How does Tin react with:
   a) Air
   b) Nitric Acid
   c) Sodium hydroxide
   d) Water
4. What are important ores of Boron? How Boron does is extracted from its important ore. Write the chemical properties of Boron and also its uses.
5. Write notes on following:
   a) Lunar caustic
   b) Stannous Chloride
   c) Red lead
   d) Diborane
   e) Silicon
6. a) Write the method of preparation of hydrogen peroxide. Show how its behaves both as oxidizing and reducing agents by giving example in each case.
   b) How H_2O_2 reacts with:
      i. Water
      ii. KI solution
      iii. Hydrazine
      iv. Acidic solution of potassium Ferro cyanite.
7. Discuss the general chemistry of group IIB elements in periodic table with special reference to:-
      i. Electronic configuration
      ii. Valency
      iii. Ionization potential
      iv. Complex foumation
      v. Oxidation state
      vi. Electron affinity.

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Physical Chemistry

1. State and Explain the reason which led ven der Waal's to modify the ideal gas equation. Derive the van der waal's equation of state.
   b) Calculate the temperature at which root mean square and average speed of oxygen gas are all equal to 1500ms^{-1}.
   c) Deduce charle's law, Boyle's low and Datton's law of partial pressure from kinetic theory of gases.
2. Write short notes on
   a) Kirchoff's law
   b) Band Energy
   c) Adiabetic expansion
   d) Heat capacities
3. a) State and define first law of thermodynamics. What are its's application and limitation.
   b) Drive a relationship between Cp and Cv.
4. a) State and Explain elevation in boiling point. Derive an expression for elevation in boiling point also explains how boiling point elevation is a colligative property.
   b) On a hill station pure water boils at 99.82°C. The K_b of water is 0.513°Ckg mol^{-1}. Calculate the boiling point of 0.69 m solution of urea.
5. a) State and Explain Raoult's law for relative lowering of vapour pressure. Deduce the similarities and difference between Raoult's law and Hevery's law.
   b) The vapour pressure of water at 296k is 19.8 mm of Hg, 0.1 mol of glucose is dissolved in 178.2 g of water. Calculate the vapour press of resultant solution.
6. a) State and Explain law of mass action. Drive the law of chemical equilibrium. Drive the relationship between Kp and Kc
   b) What are applications of Le – chatelier's principle to physical and chemical equilibrium?
7. Write short notes on:
   a. Osmotic pressure
   b. Hess's law
   c. Le – Chatelier's principle
   d. Internal energy
   e. Enthalphy

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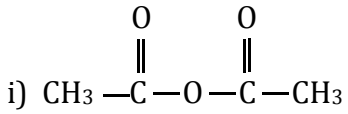
Organic Chemistry

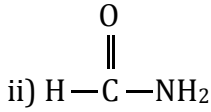
1. a.) How Nitrogen is estimated in an Organic compound by using K J eldahl's method?
   b) How will you determine molecular weight of an organic acid by silver salt method?
2. Write short notes on:
   a) Indvetive effect
   b) Electrometric effect
   c) Resonance
   d) Mesomeric effect
   e) Hybridization
3. a) Give two reactions for preparation of anhydrides and acid chloride.
   b) How anhydride reacts with
      i. Ethyl alcohol
      ii. H_2O
      iii. Ammonia
      iv. Methyl amine
      v. $LiAlH_4$
4. a) Write the lab method and industrial preparation of formic acid. write some its physical properties.
   b) How will its react with:
      i. NaOH ii. PCl_5 iii. $SOCl_2$ iv. NH_3
      v. Ethyl Alcohol vi. P_2O_5 vii. $LiAlH_4$

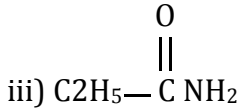
   c) Why is formic acid stronger acid the acetic acid.

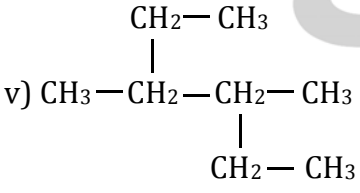
5. a) Outline the total synthesis of glycerol from C and H. What are physical properties of glycerol?
   b) How glycerol reacts with:
      i. PCl_5 ii. Acetyl chloride iii. Carboxylic Acid iv. HCl
      v. Oxalic Acid vi. HNO_3 vii. HI

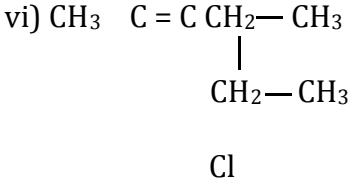
6. a) Write IUPAC nomenclature of the following compound:

i) 

ii) 

iii) 

v) 

vi) 

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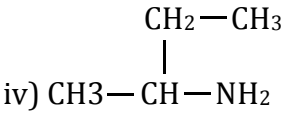
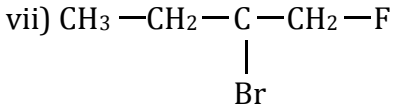
iv) 

vii) 

b) Write down structure formula of the following compound:-

i. 2 – methoxy – 4 – ethyl hexanol
ii. 2 – chloropentanal
iii. 4 – methyl pentan – 2 – one
iv. 3 – methyl butanoic acid
v. 3 – chloro – 4 – bromopentanoic acid
vi. ethanoyl chloride
vii. butanoyl chloride

7. a) Define hybridization. What type of hybridization is required to explain the bonding in methane, ethylene and acetylene?
   b) How would you estimate oxygen and halogen in an organic compound? Also describe the procedure and calculation of the method.

8. a) How are acetaldehyde and acetone prepared from alcohol?
   b) How acetone and acetaldehyde reacts with:

i. $NaHSo_3$	ii. Hydrazine
iii. HCN	iv. Grignard reagent
v. NH_3	vi. Hydroxyl amine
vii. Ethyl alcohol	

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