

- NOTE: i) All the questions are compulsory
ii) Figures to the right indicate full marks
iii) Use of nonprogrammable calculator/ log table is allowed

Q1.A) select the correct option from the following statements and rewrite the statement (any 09)

9 marks

- 1) The molecularity of reaction $X + 2Y$ gives product is
i) 1 ii) 2 iii) 3 iv) 4
- 2) In the context of chemical reaction what distinguishes a complex reaction from simple reaction?
i) Complex reaction involves multiple step and intermediate species
ii) Complex reaction occurs only in organic chemistry
iii) simple reaction are faster than Complex reactions
iv) Complex reactions do not involve any catalyst
- 3) when a solute distribute itself between two immiscible liquids in contact with each other a mathematical constant ratio exist between
i) the weight of solute into liquids ii) concentration of solute in two liquids
iii) number of moles of solute in two liquids iv) number of atoms of solute in two liquids
- 4) system that shows lower critical solution temperature is
i) triethylamine - water ii) phenol - water iii) nicotine - water iv) oil - water
- 5) Nitrogen dioxide and nitrogen tetraoxide are in
i) Temperature dependent equilibrium ii) Pressure dependent equilibrium
iii) Concentration dependent equilibrium iv) Volume dependent equilibrium
- 6) Nitric oxide is prepared on large scale by
i) Willkinson's process using platinum as catalyst ii) Van't Hoff process using platinum as catalyst
iii) Pfann's process using platinum as catalyst iv) Ostwald's process using platinum as catalyst
- 7) what is the hybridization of silica?
i) sp^3 ii) sp^2 iii) sp iv) dsp^3
- 8) Nitrous oxide is
i) NO ii) N_2O iii) N_2O_3 iv) NO_2
- 9) The carbonyl group is highly polar due to difference in electronegativity of _____ atoms.
i) C and O ii) C and P iii) C and N iv) C and S
- 10) Aldehyde are more reactive towards _____ reagents than ketones due to presence of electron donating alkyl groups.
i) Nucleophilic ii) electrophilic iii) Neutral iv) Non aqueous
- 11) Gattermann Koch formylation method is used to prepare _____.
i) Aromatic Aldehyde ii) Phenols iii) Nitrobenzene iv) Phenolic ether
- 12) Aldehyde or Ketone reacts with a primary amine to give an _____.
i) Enamines ii) Imines iii) Iminium Salt iv) Amine

B) state whether the following statements are true or false

3 marks

- 1) Nicotine water system shows both upper and lower critical solution temperature.
- 2) Nitrogen exhibits allotropy.
- 3) Rosenmund reduction is a selective reduction of acid halide into an aldehyde by hydrogenation.

C) Match the Following

3 marks

- | | |
|------------------------|-------------------------|
| 1) Rosenmund Reduction | a) +2 |
| 2) Branched polymer | b) H_2 -Pd/ $BaSO_4$ |
| 3) Pb | c) low tensile strength |

Q2) Answer the following questions (any four)

20 marks

1. Explain types of complex reaction with suitable example.
2. State and derive Raoult's law.
3. Explain phenol water system with proper diagram.
4. Explain in detail positive and negative deviation.
5. A polymer sample has 4 different kinds of molar masses as 1.5×10^5 , 2.0×10^5 , 3.5×10^5 and 5×10^5 present in ratio 1:3:4:2.
Calculate i) number average molecular weight and ii) weight average molecular weight.
6. Differentiate between linear polymer and branched polymer.

Q3) Answer the following questions (any four)

20 marks

1. Discuss general trends in physical and chemical properties of Nitrogen family elements
2. Discuss properties of hydrides of Nitrogen family elements
3. Discuss preparation, properties, structure and uses of any three oxides of Nitrogen
4. Discuss Czochralski pulling technique for single crystal growth.
5. Discuss the occurrence, structure and inertness of SiO_2 .
6. Discuss the structure and electron count in diborane and Tetraborane.

Q4) Answer the following questions (any four)

20 marks

1. What is tautomerisation? Give the mechanism of acid catalysed enolization.
2. Explain the mechanism of Knoevenagel reaction.
3. Explain mechanism and application of benzoin condensation reaction.
4. Explain the use of following reagents in preparation of aldehyde and ketones.
 - i) Pyridium Chlorochromate (PCC)
 - ii) Grignard reagent
5. How will you convert
 - i) Benzene into Acetophenone
 - ii) Benzaldehyde into Benzaldehyde sodium bisulphite
6. Explain reduction of aldehyde and ketone using Lithium Aluminium Hydride.

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