

B.Sc. Semester - 3 (CBCS) Examination
Nov/Dec. -2021 (OLD COURSE)
CHEMISTRY (CORE)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
 2. Figures to the right indicate marks.
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- Q.1 (A) Answer the following question. (04)
(1) Define Eigen function and Eigen value and write equation for Normalized and Orthogonal condition.
- Q.1 (B) Answer the following question. (Any two) (10)
(1) Derive Schrodinger's wave equation in three dimensions (Cartesian co-ordinate).
(2) Derive potential energy of H^+_2 molecule and derive Schrodinger wave equation for it.
(3) Derive co-efficient of wave function for sp^2 hybridization.
- Q.2 (A) Answer the following question. (04)
(1) Explain magnetic properties of lanthanide ions.
- Q.2 (B) Answer the following questions. (Any two) (10)
(1) Explain uses of lanthanide elements.
(2) Discuss ion exchange method for separation of lanthanide ions.
(3) What are benzyne? Give benzyne mechanism for Nucleophilic Substitution Reaction of aryl halide.
- Q.3 (A) Answer the following question. (04)
(1) Explain Hinsberg reaction in detail.
- Q.3 (B) Answer the following questions. (Any two) (10)
(1) Discuss diazotization reaction of Aniline and prepare chlorobenzene, bromobenzene, phenol and benzene from benzene diazonium salt.
(2) Discuss Lucas test with mechanism.
(3) Discuss acidity of phenol with factors affecting on it.
- Q.4 (A) Answer the following question. (04)
(1) Write equation of phase rule and define phase, component and degree of freedom.
- Q.4 (B) Answer the following questions. (Any two) (10)
(1) Explain Kolbe's Schmidt reaction with mechanism.
(2) Describe phase diagram of Na-K system.
(3) State limitations of phase rule.
- Q.5 (A) Answer the following question. (04)
(1) Discuss factors affecting on solubility in detail.
- Q.5 (B) Answer the following questions. (Any two) (10)
(1) Derive Nernst distribution law and state its limitations.
(2) Explain steam distillation with its applications.
(3) Discuss Henry's law with its limitations.
