

B.Sc. Semester - 3 (CBCS) Examination
December. -2020 [NEW COURSE]
Chemistry-C301(Core)

Time: 1:30 Hours**Marks: 42****Instructions:**

1. Figure to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any three of the following questions.
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- Q. 1 (A) Answer the following question. (4)**
(1) Discuss postulates of wave mechanics.
- Q.1 (B) Answer the following question. (Any two) (10)**
(1) Derive Schrodinger's wave equation in three dimensions.
(2) Derive potential energy and Schrodinger's wave equation for H_2^+ molecule.
(3) Discuss magnetic properties of first transition (3d) series elements.
- Q. 2 (A) Answer the following question. (4)**
(1) Discuss Hinsberg test for identification of 1^0 , 2^0 and 3^0 amines.
- Q. 2 (B) Answer the following questions. (Any two) (10)**
(1) Explain basicity of amines and discuss effect of substituent and solvent on basicity.
(2) Discuss addition elimination reaction for nucleophilic substitution in aryl halide.
(3) Discuss Pinacol-Pinacolone rearrangement with mechanism.
- Q. 3 (A) Answer the following question. (4)**
(1) State equation of phase rule and define phase, component and degree of freedom.
- Q. 3 (B) Answer the following questions. (Any two) (10)**
(1) Describe the phase diagram of Incongruent melting point system.
(2) Vapour pressure of chloroform ($CHCl_3$) and dichloromethane (CH_2Cl_2) at 298 K are 200 mmHg and 415 mmHg respectively. **(i)** Calculate the vapour pressure of the solution prepared by mixing 25.5 g of $CHCl_3$ and 40.0 g of CH_2Cl_2 at 298 K **(ii)** Calculate mole fraction of each component in solution.
(3) Derive Nernst equation when solute associate and dissociate in the solvent.
- Q. 4 (A) Answer the following question. (4)**
(1) Write short note on Misch metal.
- Q. 4 (B) Answer the following questions. (Any two) (10)**
(1) Discuss color properties of lanthanide ions.
(2) Explain Lucas Test with mechanism.
(3) Discuss phase diagram of sulphur system.
- Q. 5 (A) Answer the following question. (4)**
(1) Explain oxidation of alcohol with HIO_4 .
- Q. 5 (B) Answer the following questions. (Any two) (10)**
(1) Explain ion exchange chromatography for separation of lanthanide ions.
(2) How benzene diazonium salt is prepared? Write chemical properties of diazonium salt.
(3) Explain steam distillation and state its application.
