

Subject Code: 3130506

Date: 28/11/2019

Subject Name: Applied Chemistry

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

	Marks
Q.1 (a) Explain condensed system.	03
(b) Derive Gibbs phase rule thermodynamically.	04
(c) State the Hess law and illustrate with suitable examples.	07
Q.2 (a) Describe: Liquid crystal	03
(b) Explain principle of Mass spectrometry	04
(c) Discuss the Phase diagram of Zn-Cd system.	07
OR	
(c) Explain concept hybridisation with simple organic molecules	07
Q.3 (a) Difference between the terms configuration and conformation.	03
(b) Derive Schrödinger wave equation.	04
(c) Discuss stereochemistry of tartaric acid.	07
OR	
Q.3 (a) Discuss the terms carbanion and free radical	03
(b) Explain mechanism of nucleophilic substitution	04
(c) Explain racemisation of optical isomers with suitable examples.	07
Q.4 (a) Define: Degree of freedom and component	03
(b) A first order reaction is 10% completed in 20 minutes. How long will it take to be 70% complete?	04
(c) Explain pseudo order first reaction. Derive the equation for first order reaction.	07
OR	
Q.4 (a) Explain Heisenberg Uncertainty Principle	03
(b) Discuss the properties of insulators	04
(c) Discuss Parachor and Explain role of parachor in determining the chemical constitution of a compound	07
Q.5 (a) Predict the NMR spectrum of $\text{CH}_3 \cdot \text{CH}_2 \cdot \text{OH}$	03
(b) The heat of combustion of methane is $-890.65 \text{ kJ mol}^{-1}$ and heat of formation of CO_2 and H_2O are $-395.5 \text{ kJ mol}^{-1}$ and $286.0 \text{ kJ mol}^{-1}$ respectively. Calculate the heat of formation of methane. ($R=8.314 \text{ J/degree.mol}$)	04
(c) Name any four important surface characterization techniques and explain any one technique in detail.	07
OR	
Q.5 (a) Define terms : (i) Order of reaction	03
(ii) thermo chemistry	
(b) Explain Florescence spectroscopy	04
(c) Discuss the properties and application of zeolites	07
