

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****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
<b>Q.1</b> (a) Explain condensed system.	<b>03</b>
(b) Derive Gibbs phase rule thermodynamically.	<b>04</b>
(c) State the Hess law and illustrate with suitable examples.	<b>07</b>
<b>Q.2</b> (a) Describe: Liquid crystal	<b>03</b>
(b) Explain principle of Mass spectrometry	<b>04</b>
(c) Discuss the Phase diagram of Zn-Cd system.	<b>07</b>
<b>OR</b>	
(c) Explain concept hybridisation with simple organic molecules	<b>07</b>
<b>Q.3</b> (a) Difference between the terms configuration and conformation.	<b>03</b>
(b) Derive Schrödinger wave equation.	<b>04</b>
(c) Discuss stereochemistry of tartaric acid.	<b>07</b>
<b>OR</b>	
<b>Q.3</b> (a) Discuss the terms carbanion and free radical	<b>03</b>
(b) Explain mechanism of nucleophilic substitution	<b>04</b>
(c) Explain racemisation of optical isomers with suitable examples.	<b>07</b>
<b>Q.4</b> (a) Define: Degree of freedom and component	<b>03</b>
(b) A first order reaction is 10% completed in 20 minutes. How long will it take to be 70% complete?	<b>04</b>
(c) Explain pseudo order first reaction. Derive the equation for first order reaction.	<b>07</b>
<b>OR</b>	
<b>Q.4</b> (a) Explain Heisenberg Uncertainty Principle	<b>03</b>
(b) Discuss the properties of insulators	<b>04</b>
(c) Discuss Parachor and Explain role of parachor in determining the chemical constitution of a compound	<b>07</b>
<b>Q.5</b> (a) Predict the NMR spectrum of $\text{CH}_3 \cdot \text{CH}_2 \cdot \text{OH}$	<b>03</b>
(b) The heat of combustion of methane is $-890.65 \text{ kJ mol}^{-1}$ and heat of formation of $\text{CO}_2$ and $\text{H}_2\text{O}$ are $-395.5 \text{ kJ mol}^{-1}$ and $286.0 \text{ kJ mol}^{-1}$ respectively. Calculate the heat of formation of methane. ( $R=8.314 \text{ J/degree.mol}$ )	<b>04</b>
(c) Name any four important surface characterization techniques and explain any one technique in detail.	<b>07</b>
<b>OR</b>	
<b>Q.5</b> (a) Define terms : (i) Order of reaction	<b>03</b>
(ii) thermo chemistry	
(b) Explain Florescence spectroscopy	<b>04</b>
(c) Discuss the properties and application of zeolites	<b>07</b>

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