



SB-3511

M. Sc. (Part - II) Examination

March / April – 2011

Physical Chemistry : Paper - I

Time : 3 Hours]

[Total Marks :70

Instructions :

(1)

नीचे दशांशके निशानीवाणी विगतो उत्तरवडी पर अवश्य लभवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
M. SC. (PART - II)	<input type="text"/>
Name of the Subject :	<input type="text"/>
PHYSICAL CHEMISTRY : PAPER - I	<input type="text"/>
Subject Code No. : <input type="text"/> 3 <input type="text"/> 5 <input type="text"/> 1 <input type="text"/> 1	<input type="text"/>
Section No. (1, 2,.....) : <input type="text"/> 1&2	
	Student's Signature

(2) Attempt all the six questions.

(3) Figures to the **right** indicate full marks.

SECTION – I

- 1 (a) Classify ensemble and explain its probability in statistical mechanics. 4
- (b) Describe grand canonical ensemble and explain the system with more than one component. 4
- (c) Derive statistically heat capacity in terms of partition function. 4

OR

- 1 (a) Derive Boltzmann distribution law. 4
- (b) Describe statistical derivation of entropy and enthalpy for ideal and nonideal binary solutions. 4
- (c) Give an account of quantum effect in statistical mechanics. 4
- 2 (a) Write a note on liposomes. 4
- (b) Explain various interactions in biopolymer. 4
- (c) Describe enzymes as biocatalysts and briefly explain Michelis Menton plot and Lineweaver-Burk plot. 3

- 3 (a) Define the terms : HLB, CMC, aggregation number and hydrophobic effect. 4
- (b) Discuss mass action model for thermodynamics of micellization. 4
- (c) What is solubilization and discuss factors affecting solubilization ? 4

OR

- 3 (a) Write a note on microemulsions. 4
- (b) Explain various factors affecting CMC. 4
- (c) Define a surfactant and give its classification. 4

SECTION – II

- 4 (a) Discuss the effect of salt on rate of reaction. 4
- (b) Give detail comparison between solution and gas phase reaction. 4
- (c) Explain steady state and equilibrium treatment for catalyzed reaction. 3

OR

- 4 (a) Describe basic assumptions of transition state theory and derive the expression. 4
- (b) Define Ionic strength. Derive relation showing influence of ionic strength on the rate of ionic reactions. 3
- (c) Explain substituent and correlation effects in Hamett equation. 4

- 5 (a) Write a short note on Coupling Constant J. 3
- (b) What is chemical shift and discuss factors affecting it ? 4
- (c) Discuss various monochromator used in IR. 5

OR

- 5 (a) Give the total number of NMR signals in diethyl succinate, propyl formate, ethoxy acetic acid and mesitylene. 4

- (b) Explain Bolometer and Golay cell detector. 4
- (c) Describe different modes of vibrations in IR-spectroscopy. 4
- 6** (a) Write a note on semi-empirical mass equation. **6**
- (b) Explain various units involved in radiation dosimetry. **3**
- (c) Give applications of supercritical fluids. **3**

OR

- 6** (a) Explain chemical and radiation dosimetry. **3**
- (b) Mention twelve principles of green chemistry. **6**
- (c) Discuss the merits of shell model and liquid drop model. **3**
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