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RF-3461-62

M. Sc. (Part - I) Examination

April / May – 2010

Chemistry : Paper - IV

(Physical Chemistry)

Time : **3** Hours] [Total Marks : **54**

RF-3461

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :
☛ **M. SC. (PART - 1)**

Name of the Subject :
☛ **CHEMISTRY - 4**

☛ Subject Code No. : **3 4 6 1** ☛ Section No. (1, 2,.....) : **1**

Seat No. :

Student's Signature

(2) Attempt two sections in separate answer books.

(3) Figures to the right indicate full marks.

1	(a)	Define liquid crystals and give their applications.	**4**
	(b)	Write a note on smectic liquid crystals.	**3**
	(c)	Explain lyotropic mesomorphism.	**2**

OR

1	(a)	How are liquid crystals classified? Explain thermotropic liquid crystals.	**4**
	(b)	Describe various mesogens involved in liquid crystals.	**3**
	(c)	Distinguish between liquid and plastic crystalline compounds.	**2**
2	(a)	Derive and exlain Berthelot equation of state for gases.	**3**
	(b)	Write a short note on intrinsic Semiconductors.	**3**
	(c)	What are superconductors? Briefly mention their properties and applications.	**3**

OR

2	(a)	Explain band structurs of metals, insulators and semiconductors.	**3**
	(b)	Derive Dieterici equation of state.	**3**

(c) Define mean free path. Calculate the mean free path of the molecule of a gas (Collision diameter = $4\overset{\circ}{A}$) at 1 atm and 300 K. **3**

3 (a) Write a note on dynamic light scattering. **3**

(b) Explain principle and working of small angle neutron scattering. **3**

(c) Explain ATP as energy currency of cell. **3**

OR

3 (a) Give an account of ATP hydrolysis. **3**

(b) Explain passive and active transport in biomembranes. **3**

(c) Write a note on X-ray scattering method. **3**

RF-3462

Instructions :

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Name of the Examination :

☛ **M. SC. (PART - 1)**

Name of the Subject :

☛ **CHEMISTRY - 4**

☛ Subject Code No. : **3 4 6 2** ☛ Section No. (1, 2,.....) : **2**

Seat No. :

Student's Signature

(2) Attempt two sections in separate answer books.

(3) Figures to the right indicate full marks.

4 (a) Why is it necessary to pass N_2 gas through the solution before taking a D.C. polarogram? Expalin. **3**

(b) Describe the standard addition method for the quantitative analysis used in D.C. polarography. **3**

(c) Write a note on Wien effect. **3**

OR

4 (a) Derive the cathodic polarographic wave equation and its interpretation. **3**

(b) Explain polarographic maximum suppressor. **3**

(c) Briefly describe relaxation and electrophoretic effects in strong electrolyte solutions. **3**

5	(a)	Describe a nuclear reactor listing its major components.	**3**
	(b)	What is the biological effect of nuclear radiation on body?	**3**
	(c)	Explain principle of stopped flow method for fast reactions kinetics.	**3**

OR

5	(a)	Define the terms : Neutron multiplication factor and critical assembly.	**3**
	(b)	Describe temperature jump or pressure jump method in the study of fast reactions with suitable examples.	**3**
	(c)	Explain proton-proton and carbon-nitrogen cycle for the production of the stellar energy.	**3**
6	(a)	Explain Heterogeneous catalysis and its mechanism.	**3**
	(b)	Explain adsorption phenomenon from solution.	**3**
	(c)	Explain Enzyme catalysis.	**3**

OR

6	(a)	Mention the important application of adsorption.	**3**
	(b)	Explain phase change from pressure area curve.	**3**
	(c)	Write a note on catalysis.	**3**