



D-1388

M. Sc. (Sem. II) (Reg. & Eve. Course & Self Finance) Examination

March / April - 2016

Chemistry : Paper - III
(Physical Chemistry)

Time : 3 Hours]

[Total Marks : 70

Instructions :

(1)

नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवडी पर अवश्य कपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="checkbox"/> M. Sc. (Sem. II) (Reg. & Eve. Course & Self Finance)	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="checkbox"/> Chemistry : Paper - III (Physical Chemistry)	<input type="text"/>
Subject Code No. : <input type="text"/> 1 <input type="text"/> 3 <input type="text"/> 8 <input type="text"/> 8	<input type="text"/>
Section No. (1, 2,.....) : <input type="text"/> Nil	
Student's Signature	

(2) Attempt all four questions.

(3) Figures to the right indicate full marks.

1 Attempt any three questions: 18

- Describe Debye Huckel theory of inter-ionic attraction including relaxation and electrophoretic effect.
- Explain the conductance method to determine dissociation constant of monobasic acid.
- Explain solubility method to determine activity coefficient.
- Calculate the ionic strength of a mixture containing 30 ml 0.03M H₂SO₄ and 50 ml 0.02 M AlCl₃ solution.

2 Attempt any three questions: 18

- Derive the equation $v = \frac{1}{2\pi} \cdot \sqrt{\frac{k}{\mu}}$
- Derive the equation for fundamental band, first overtone and second overtone band and discuss them in detail.
- Explain the use of tracer technique in ester hydrolysis and oxidation of fumaric acid.
- The rotational lines of ¹H⁷⁹Br are separated by 16.90 cm⁻¹. Calculate the moment of inertia and the internuclear distance of HBr in SI units.
(given m_H = 1.66 × 10⁻²⁷ kg, m_{Br} = 131.16 × 10⁻²⁷ kg, h = 6.626 × 10⁻³⁴ Js, c = 3 × 10⁸ ms⁻¹)

- 3** Attempt any three questions: **18**
- (a) Explain the factors affecting CMC of surfactants.
 - (b) Discuss electrical double layer theory with figure indicating Stern layer and Gouy-Chapman layer.
 - (c) Explain the solubilization, microemulsion and reverse micelle.
 - (d) Explain Gibbs adsorption isotherms.
- 4** Attempt any four questions : **16**
- (a) Explain method to measure overvoltage.
 - (b) Discuss Isotopic dilution analysis.
 - (c) Write a note on Proportional Counter.
 - (d) Explain the counter ion binding to micelle.
 - (e) The rotational spectrum in the far IR region of HCl consists of a series of equidistant lines with spacing of 20.7 cm^{-1} . Calculate Bond Length of the HCl in cm.
[At. wt. H = 1.01, Cl = 35.45, $N = 6.023 \times 10^{23}$,
 $h = 6.626 \times 10^{-27} \text{ erg sec}$]
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