



AC-1416

M.Sc. (Sem. II) (Regular & Evening) Examination

April/May – 2015

Chemistry : Paper - III

(Physical Chemistry)

Time : 3 Hours]

[Total Marks : 70

Instructions :

(1)

नीचे दृशावेक निशानीवाणी विगतो उत्तरवही पर अवश्य कपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="M.SC. (SEM. II) (REGULAR & EVENING)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="CHEMISTRY : PAPER - III"/>	<input type="text"/>
Subject Code No. : <input type="text" value="1"/> <input type="text" value="4"/> <input type="text" value="1"/> <input type="text" value="6"/>	<input type="text"/>
Section No. (1, 2,.....) : <input type="text" value="Nil"/>	<input type="text"/>
	Student's Signature

(2) Attempt all four questions.

(3) Figures to the right indicate full marks.

1 Attempt any three questions: 18

- Discuss decomposition potential, over voltage and concentration polarisation.
- Explain the EMF method to determine activity coefficient.
- Describe Tafel theory of hydrogen overvoltage in detail.
- Calculate the ionic strength of a mixture containing 40 ml 0.03 M nitric acid and 60 ml 0.02 M cobalt phosphate solution.

2 Attempt any three questions: 18

- Discuss the use of the effect of isotopic substitution in molecular spectra.

(b) Derive the equation $\nu = \frac{1}{2\pi} \cdot \sqrt{\frac{k}{\mu}}$ for vibrational spectra.

- The rotational constant for $^1\text{H}^{35}\text{Cl}$ is observed to be 10.5909 cm^{-1} . What are the values of rotational constant(B) for $^1\text{H}^{37}\text{Cl}$ and for $^2\text{D}^{35}\text{Cl}$?

[H = 1 amu, D = 2 amu, N = 6.023×10^{23}]

- Discuss inorganic and organic scintillators.

- 3** Attempt any three questions : **18**
- (a) What are surface active agents ? Explain their classification.
 - (b) Explain the zeta potential and its determination by electrophoresis.
 - (c) Explain the thermodynamics of micellization.
 - (d) Explain Gibbs adsorption isotherms.
- 4** Attempt any four questions: **16**
- (a) Discuss Electrolytic polarization and decomposition potential.
 - (b) Discuss neutron activation analysis.
 - (c) Write a note on G.M. Counter.
 - (d) Explain the effect of salt on zeta potential.
 - (e) The internuclear distance (i.e. bond length) of CO molecule is 1.13 \AA . Calculate the energy in Joules in the first excited rotational level. The atomic masses of single atoms are $C^{12} = 1.99 \times 10^{-26} \text{ kg}$, $O^{16} = 2.66 \times 10^{-26} \text{ kg}$,
[$N = 6.023 \times 10^{23}$, $h = 6.626 \times 10^{-34} \text{ Js}$].
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