

Chemistry

M.Sc.

Semester - III

EC - 02

Physical Chemistry (special)

Dr. Jagdish Prasad
Deptt. of Chemistry
Tata college, Chaibasa

Full marks: 70

Time - 3 hrs.

General Instructions:

1. Question one (1) is compulsory.
2. Answer any four (4) questions out of the Seven questions.

1. Fill in the blanks:

10 X 1 = 10

(i) n-p-n Junction is called

(ii) Atomic mass $\times \dots = 6.4$

(iii) Poly acetylene is the type of polymer.

(iv) Atomic heat capacity at absolute zero temperature.

(v) Specific Surface area = $\frac{\text{Surface Area}}{\dots}$

(vi) According to Langmuir

for each of the Acids $\text{CH}_3-(\text{CH}_2)_{14}-\text{COOH}$, $\text{CH}_3-(\text{CH}_2)_{16}-\text{COOH}$,
 $\text{CH}_3(\text{CH}_2)_{24}-\text{COOH}$ the value of $\frac{A_0}{N_i} = \dots (A^0)^2$

(vii) Helium acts as superconductor at Kelvin temp.

(viii) At any above absolute zero temp, an insulator behave as a

(ix) $2d \sin \theta = \dots$

(x) The rate of evaporation from the first layer is equal to the on each Bare surface.

2. (a) Explain Indexing Powder Pattern for cubic and tetrahedral crystals.

(b) Using diffraction of x-rays crystals deduce Bragg's equation in reciprocal

8 + 7 = 15

3. (a) Explain microscopic theory of surface conductivity. 8+7=15
 (b) Discuss the applications of superconductivity transformations of order disorder transitions.
4. (a) Discuss conduction band theory for the metallic conductivity.
 (b) Explain n-type and p-type semiconductors. 10+5=15
5. (a) Derive BET equation for multimolecular Adsorption isotherm.
 (b) Explain statistical mechanics of Adsorption. 10+5=15
6. (a) Write the application of conduction polymers 6+9=15
 (b) Define NO. average molar mass, and Weight average molar mass of polymers.
 Discuss viscosity method for determining molar mass of the polymers.
7. (a) Explain the Synthesis of polymer liquid crystals.
 (b) Discuss liquid crystalline order in biological material. 8+7=15
8. (a) Deduce classical theory of specific heat of solids.
 (b) Prove that

$$C_v = 3R \left[\frac{12}{\pi^3} \int_0^\infty \frac{\psi^3 d\psi}{e^\psi - 1} - \frac{3\pi}{e^\pi - 1} \right] \quad 8+7=15$$

=====X=====

Set - IV (3)

EC-2

- (I) Amplifier (Required to convert AC to DC)
- (II) Specific heat
- (III) electrical conductor
- (IV) vanishes
- (V) mass of adsorbent.
- (VI) 20
- (VII) 4
- (VIII) Semiconductor
- (IX) n_A
- (X) Rate of condensation.

Singh
23/4/2020