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1243/MH

CS-2058
PHYSICAL CHEMISTRY-III
(Common for B.Sc., B.Sc. Biotech.)
(Semester-VI)

Time Allowed : 3 Hours] **[Maximum Marks : 26**

Note :- Attempt two questions each from Section A and B carrying 4 marks each, and the entire Section C consisting of 5 short answer type questions carrying 2 marks each is compulsory. Attempt five questions in all.

SECTION-A

I. (a) Discuss electronic spectra ? Give its selection rules. 2
(b) Out of stokes lines and antistokes lines which are more intense & why ? 2

II. (a) Derive an expression for pure rotational spectra of diatomic molecule. 2
(b) What do you understand by polarisation and polarizability ? What are the factors which affect it ? 2

III. (a) Derive an expression for Bragg's equation. 2

(b) Discuss laws of symmetry and law of constancy of interfacial angles. 2

IV. (a) Discuss powder method of X-ray diffraction studies by crystals. 2

(b) What are Miller indices ? Find the Miller Indices for the intercept (2a, 3b, 2c) made by a plane. 2

SECTION-B

V. (a) Discuss the factors responsible for low and high quantum yield. 2

(b) Certain substance absents 5×10^{21} quantas of light per sec. If 10.0×10^{21} no. of molecules was found to have reacted. Calculate Quantum yield. 2

VI. Discuss the following :

(a) Phosphorescence.

(b) Chemiluminiscence.

(c) Photo inhibiters .

(d) Inter system crossing. (4x1=4)

VII. (a) Differentiate between Thermochemical reactions and Photochemical reaction. 2

(b) Draw and discuss Jablonski Diagram. 2

VIII. (a) Write a note on "LASERS". 2

(b) Discuss the photochemistry colours. 2

SECTION-C
(Compulsory Question)

IX. (a) Which of the following molecules will show Raman Spectra and why ?

CO, H_2, HCl, SF_4 .

(b) Define space lattice and Unit cell.

(c) What are bonding and antibonding molecular orbitals. Discuss on the basis of potential energy curves.

(d) What are the advantages of Raman spectra over Infrared spectroscopy ?

(e) Discuss Laue's method of X-ray diffraction studies by crystals. (5x2=10)