

PC-743/MH

CS/2051

PHYSICAL CHEMISTRY-III (Semester-VI)

Time : Three Hours]

[Maximum Marks : 26

Note : Attempt *two* questions each from Sections A and B carrying 4 marks each and the entire Section C consisting of 5 short answer type questions carrying 2 marks each.

SECTION - A

- I. (a) Define polarisability and polarisation. Discuss the factors affecting it. 2
(b) Give advantages of Raman spectra over IR spectra. 2
- II. (a) State and explain Franck Condon principle. 2
(b) Discuss the various types of electronic transitions involved in organic molecules. 2
- III. Explain the following :
- (a) Law of rationality of indices. 2
(b) Law of constancy of interfacial angles. 2

- IV. (a) Discuss the crystal structure of CsCl. 2
(b) Derive Bragg's equation. 2

SECTION – B

- V. (a) Discuss the various photo-physical processes taking place from the excited states with the help of Jablonskii diagram. 3
(b) What is photosensitization? Give example. 1

- VI. State and explain : 4
(i) Grothus-Drapper law of photochemistry.
(ii) Stark-Einstein Law.

- VII. (a) Write a short note on LASERS. 2
(b) Discuss the photochemistry of colours. 2

- VIII. Discuss the photochemistry of following reactions :
(i) Photolysis of acetone.
(ii) Photolysis of HBr.

SECTION – C

(Compulsory Question)

- IX. Write short notes on the following :
(a) Define space lattice and unit cell.

- (b) Briefly explain powder method for the determination of crystal structure.
 - (c) Define quantum yield and discuss the factors responsible for low and high quantum yield.
 - (d) Differentiate between thermochemical and photochemical reactions.
 - (e) Why the electronic bond spectra of a molecule is highly complex. (5×2=10)
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