

B.A/B.Sc. - 6th Semester (old sylb 2019-20)

(2721)

Paper: Chemistry (Physical Chemistry-B)

Time Allowed: 2 hrs.

Max. Marks: 35

Note: There are EIGHT questions of equal marks. Candidates are required to attempt any FOUR questions.

1. State and explain the following:
  - a) Planck's radiation law.
  - b) Photoelectric effect
  - c) Compton effect
  - d) Degeneracy (2.5, 2.5, 2.5, 1.25)
2. Set up Schrodinger wave equation for a particle in three dimensional box. (8.75)
3.
  - a) Draw and explain radial distribution curves for 1s, 2p and 3d.
  - b) Differentiate between radial and angular wave functions.
  - c) What are well-behaved functions? Explain. (3.75, 2.5, 2.5)
4. Set up Schrodinger wave equation for hydrogen atom in Cartesian coordinates and transform it into spherical coordinates. Separate the equation into three independent equations each involving single variable. (8.75)
5.
  - a) Describe Laue's method for the determination of crystal structure of NaCl.
  - b) Derive an expression for Bragg's law. (4.75, 4)
6.
  - a) Elaborate the role of symmetry elements in crystals?
  - b) Describe Debye's theory of heat capacity of solids.
  - c) What are Miller indices? Give their significance. (3, 3, 2.75)
7. Draw Jablonski diagram and explain various photophysical processes involved in it. (8.75)

Contd....P/2

(2)

8. a) Throw light on photosensitized reactions giving suitable examples.
- b) Why does the quantum yield of photochemical reaction sometimes deviate considerably from unity?
- c) State and explain laws of photochemistry.

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(3.75, 1.25, 3.75)

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