বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

M.Sc. Examinations 2020
Semester IV
Subject: ELECTRONICS
Paper: ELC - 404
(Theory)

Full Marks: 40 **Time: 2hrs.**

Candidates are required to give their answers in their own words as far as practicable.

Answer any one of the following:

1. Using time independent perturbation theory, derive an expression for second order perturbation in energy.
2. Prove that the density of state in two dimensions is independent of energy.
3. Obtain an expression for numerical aperture of multimode fiber.
4. Explain how one can achieve less dispersion by using graded index fiber in comparison to step index fiber.
5. Find an expression for transition probability per unit time using time dependent perturbation theory.
6. Discuss how solid state photomultiplication can be obtained in a superlattice APD.
7. Explain the possible misalignment losses in optical fiber for fiber-to-fiber splicing.
8. Discuss with neat energy band diagrams the mechanism of a heterojunction LASER.
9. Discuss the basic processes involved in working of LED with band diagram.
10. Discuss different losses in optical fiber.
11. Derive an expression for minimum coupling length of an optical directional coupler to transfer maximum energy across the coupling junction.
12. Explain the working principle of photo transistor.