PHY 1701 – Engineering Physics

Assignment III

Instructions:

- *Deadline for submitting the assignment 3 is on or before 21.04.2021 (Wednesday Mid-night).*
- *Questions should be written first, followed by answers.*

1. Write a note on
   (a) Attenuation
   (b) Dispersion
2. Derive an expression for intermodal dispersion (pulse widening) in multimode step-index fiber.
3. Explain the role of optical fibre in communication with block diagram.
4. Write a short note on the working principles of (a) LED and (b) LASER diode
5. Explain about a P-I-N photodiode with a suitable diagram
6. Derive the expression for responsivity and quantum efficiency of P-I-N photodiode
7. Describe the application of fibre optics in Endoscopy and explain its working.
8. For a step index fiber, numerical aperture is 0.26 and refractive index of core is 1.5 and core diameter is 100 μm. Find the following quantities: (i) Refractive index of cladding (ii) acceptance angle (iii) critical angle.
9. A silica glass optical fiber has a core refractive index of 1.50 and the cladding refractive index 1.46. Calculate critical angle, acceptance angle and numerical aperture.
10. In an optical fibre, the core material has refractive index 1.6 and refractive index of cladding material is 1.3. Calculate the critical angle and angle of acceptance cone.