Engineering Physics-I, PHY125

Assignment, Unit-3

Q.1 Explain the structure of an optical fibre.

Q.2 What do you mean by Acceptance angle, Acceptance cone and critical angle? Derive an expression for Acceptance angle.

Q.3 What do you mean by Numerical aperture and relative refractive index difference? Derive the relation between them.

Q.4 What are the types of optical fibres? Explain in detail.

Q.5 What are the differences between step index single mode and step index multimode fibres?

Q.6 What are the differences between step index single mode and graded index fibres?

Q.7 What do you mean by cut-off parameter or V-number and number of modes of fibres?

Q.8 Explain the propagation mechanism in optical fibres.

Q.9 What do you mean by Attenuation and Dispersion in optical fibre? Explain in detail.

Q.10 Explain the concept of Intermodal and Intramodal dispersion.

Q.11 What are the advantages and disadvantages of optical fibres?

Q.12 What are the applications of optical fibres?

Q.13 An optical fibre has a core material of refractive index of 1.5 and cladding material of refractive index 1.450. Calculate its numerical aperture.

Q.14 Numerical aperture of an optical fibre is 0.39. If the difference of refractive indices of thematerial of its core and cladding is 0.05, calculate refractive index of core.

Q.15 An optical fibre has a core material of refractive index of 1.48 and cladding material of refractive index 1.46. Calculate its numerical aperture and acceptance angle.

Q.16 Acceptance angle of an optical fibre is 29.80˚. Calculate NA.

Q.17 A step index fibre is made with core of index 1.54, a cladding of index 1.50 and has a core diameter as 0.50μm. It is operated at a wavelength 1.3μm. Find the V-number and the number of modes that the fibre will support.

Q.18 A step index fiber has core refractive index 1.466, cladding refractive index 1.46. Compute the maximum radius allowed for a fibre, if it supported only one mode at a wavelength 1300nm.

Q.19 An optical fiber of length 150m has input power of 10μm and output power of 9μm. Compute the loss in dB/km.

Q.20 Write short notes on Holography.

Q.21 What is the Basic principle of holography?

Q.22 Explain in detail the concept of recording of holograms.

Q.23 Explain in detail the concept of reconstruction of image on hologram.

Q.24 What is the difference between normal photography and holography?

Q.25 What are the different types of Holograms?

Q.26 What are the applications of holography?