Module 2 Unit 3

OPTICAL FIBRES – NUMERICAL PROBLEMS

SET - 1



1. The acceptance angle of an optical fibre is 25°. Calculate RI of cladding if RI of core is 1.52.



1. Find critical angle and acceptance angle for an optical fibre having core RI 1.5 and cladding 1.48.



1. A fibre has core RI 1.5. Find its cladding RI if it is immersed in water giving acceptance angle of 8°. RI of water is 1.33.



1. For an optical fibre, fractional RI is 0.0025 and core RI is 1.45. Determine its NA and acceptance angle.



1. A fibre has acceptance angle of 25° and internal critical angle of 70°. Determine its core and cladding RI.



1. Calculate number of allowed modes for a SI optical fibre having numerical aperture 0.2 and core radius 25 μm. It is operated at 1550 nm.



1. Calculate number of allowed modes for a GRIN fibre with above specifications.



1. The core and cladding RI for a SI optical fire are 1.46 and 1.42 respectively. Find the normalized frequency and number of allowed modes if it is operated at 1.3 μm. The core radius is 0.05 mm.



1. What is the limiting radius for an optical fibre to serve as single mode at 8500 Å with numerical aperture of 0.025?



1. An optical fibre has core radius of 5 μm Will it act as a single mode fibre at 850 nm? Its core and cladding RI are 1.4 and 1.399 respectively.



1. A step index optical fibre supports 1325 modes at an operating wavelength of 1.3 µm. Determine its core radius if the numerical aperture is 0.3.
2. Determine the core radius for a GRIN fibre with above specifications.

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