DAYANANDA SAGAR COLLEGE OF ENGINEERING,
Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560078
Department of Telecommunication Engineering
Module wise questions

Course: Optical Communication and Networks (OCN)
Course Code**:**
Semester: VII A & B
Module questions: 1

Q.No	Question Description	Marks

1. A step-index multimode fiber with a numerical aperture of 0.20 supports approximately 1000 modes at an 850 nm wavelength. (i) What is the diameter of its core? (ii) How many modes does the fiber support at 1320nm?
2. Light travelling in air strikes a glass plate at an angle $\theta_1=33^0$, where θ_1 is measured between the incoming ray and glass surface. If the refracted and reflected beams make an angle of 90^0 with each other, what is the refractive index of the glass? What is the critical angle?
3. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine
   i. The critical angle at the core-cladding interface ,
   ii. Numerical aperture for the fiber,
   iii. The acceptance angle in air for the fiber.
4. A Multimode step index fiber with a core diameter of 80μm and a relative index difference of 1.5% is operating at a wavelength of 0.85μm. If the core refractive index is 1.48. Estimate Normalized frequency for the fiber (v) and the total number of guided modes.
5. A graded index fiber has a core with a parabolic refractive index profile has a diameter of 50μm . The fiber has a numerical aperture of 0.2. Estimate the total number of guided modes propagating in the fiber when it is operating at a wavelength of 1μm.
6. A multimode step index fiber has v number of 75 Numerical aperture of 0.3, refractive index of core is 1.458 and operates at 820nm. Find the core radius, Refractive index of cladding; Fractional change in refractive index and number of modes gets propagated.
7. A step index multimode fiber with a numerical aperture of 0.20 supports approximately 1000 modes at an 850nm wavelength. Determine
   i) What is the diameter of its core?
   ii) How many modes does the fiber support at 1920nm
   iii) How many modes does the fiber support at 1550nm?
8. Consider a 30km long optical fiber that has an attenuation of 0.8dB/km at 1300nm. Calculate the optical output power Pout if 200μW of optical power is launched into the fiber.

9. The input power to an optical fiber is 2mw while the power measured at the output is 2µw . If the fiber attenuation is 0.5db/km calculate the length of the fiber.
10. A continuous 12-km long optical fiber link has a loss of 1.5db/km. what is the minimum optical power level that must be launced into the fiber to maintain an optical power level of 0,3µw at the receiving end. What is the required input power if the fiber has a loss of 2.5db/km.

Module questions: 3

Q.No	Question Description	Marks

1. Following are the parameters of a point to point optical link

   Optical power launched: 3dBm, **Sensitivity** of Photo-detector:-32dBm, **Source**/detector connector loss: 1 dB, **Length** of optical cable: 60kM **Cable attenuation**: 0.3dB/km Jumper cable loss: 3db **Connector** loss at each fiber: 1dB (joint at two at each transmitter and receiver end because of the jumper cables). Computer the power margin of the link