JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-2 (April-2019)
B.Tech VIII Semester

COURSE CODE: 10B1WPH732

MAXIMUM MARKS: 25

COURSE NAME: Optical Fiber Networks

COURSE CREDITS: 3

TIME ALLOWED: 1HR 30 Min

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Attempt all the questions in sequence.*

1. Consider a laser with predicted lifetime of 20 years at an operating current of 100mA and room temperature (300K). Assuming that n=1.75, E=0.7 eV what would be its lifetime if the current is (a) Doubled (b) halved. Also calculate the life time if the temperature is raised and reduced by 10 degrees.

   [4]

2. It is predicted that a certain laser diode will have its power decreased to 90% of its initial value in 3 years. How many years will be required for the power to decrease to 10% of its initial power?

   [2]

3. Design a single-mode fiber (with V = 2.3) for operation at 1300 nm with a fused silica core (n_1 = 1.458). The numerical aperture of the fiber is to be 0.10. (a) Find the cladding index n_2 and the radius of core "*a*" of the fiber.

   [2]

4. Calculate the number of modes in a 50/125 graded-index fiber having a parabolic index (i.e., g = 2.0), n_1 = 1.485 and n_2 = 1.460 at an operating wavelengths of 820 and 1300 nm.

   [3]

5. What are different types of codes required in optical fiber communication? Explain with reference to average output power levels of output device.

   [3]

6. Explain the working of 2x2 coupler of a linear network.

   [3]

7. For an receiver power of 5 watts, calculate the Transmitted power in a star network considering insertion loss of 0.2 dB, Power split loss of 0.8 db, connector loss of 0.2 dB, Attenuation loss of 1db/Km and total length of fiber is 2.5 Km, Assuming system margins to be 10% of the total losses.

   [6]

8. Explain dynamic range with the concept of best and worst values.

   [2]