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B.E./B.TECH. DEGREE EXAMINATIONS, NOV/DEC–2011

REGULATIONS 2008

SEVENTH SEMESTER

EC 72 – OPTICAL COMMUNICATION AND NETWORKS

ELECTRONICS AND COMMUNICATION ENGINEERING

Time: Three Hours Maximum: 100 marks

ANSWER ALL QUESTIONS

PART–A (10×2=20 marks)

1. List any two conditions for which total internal reflection in a fiber is parsible.
2. Write a note on skew rays.
3. Calculate the maximum bit rate that may be obtained on a 20km repeaterlers fiber link assuming the polarization mode dispersion is 300ps/km.
4. What is a fiber coupler? What are their classifications?
5. Compare LED and ILD. (any 2)
6. What are the characteristics of a good quality photo detector?
7. List the sources of noise in a fiber optic receiver.
8. Define fiber cutoff wavelength.
9. Expand SONET.
10. Write a note on OTDR.

PART—B (5×16=80 marks)

11. (a) (i) Describe the mechanism for the transmission of bight within a optical fiber. (8)

(ii) Define acceptance angle. How it is related to the NA and the refraction indices of the fiber core and the cladding. (8)

Or

(b) (i) Explain the concept of electromagnetic modes in a planar optical waveguide. (8)

(ii) A graded index fiber with a parabolic refractive index profile core has a refractive index at the core axis of 1.5 and a relative index difference of 1%. Estimate the maximum parsuble core diameter which allows single mode operation at a wavelength of 1.3μm. (8)

12. (a) (i) Describe the linear scattering losses in optical fibers. (8)

(ii) Explain the mechanism of intermodal dispersion in a multimode step index fiber. (8)

Or

(b) (i) What is fresnel reflection in fiber joints? How it may be avoided? (8)

(ii) Describe the common techniques used for the mechanical splicing of optical fibers. (8)

13. (a) Brief about the construction, photo detection operation and properties of a PIN diode. (16)

Or

(b) (i) What are the various LED structures used for fiber optic communication? Explain. (8)

(ii) Derive an expression for internal quantum efficiency of LEDS. (8)

14. (a) Discuss about the various receiver configuration for better performance. (16)

Or

(b) With diagrams explain

(i) Total fiber alternation measurement using cutback technique. (10)

(ii) Dispersion measurement in time domain. (6)

15. (a) (i) Describe the features of SONET/SDH Networks. (8)

(ii) Discuss on the primary issues that influence the performance of WDM networks. (8)

Or

(b) Discuss on the following

(i) Optical CDMA. (8)

(ii) Wavelength routed networks. (8)
