APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER M. TECH DEGREE EXAMINATION
Electronics & Communication Engineering
(Telecommunication Engineering)
04 EC 6809—Optical Communication Systems

Max. Marks:60 Duration: 3 Hours

PARTA

Answer All Questions

Each question carries 3marks

1. An optical fiber with core refractive index of 1.50 and cladding refractive index of 1.47. Determine a) Critical angle at the core cladding interface. b)The NA for the fiber. c) The acceptance angle in air for the fiber.
2. Define the quantum efficiency and responsivity of a p-n diode. How are the two related to each other?
3. Discuss about the characteristics of distribution network light wave system architecture.
4. Explain the operation of EDFA.
5. Briefly explain fiber solitons.
6. Explain about Gordon- Hauss effect.
7. Write short notes on tunable optical fibers.
8. Explain coherent optical receiver with block diagram.

PARTB

Each question carries 6marks

9. With neat sketches explain the structure and operation of a VCSEL.

OR

10. With neat sketches explain the principle of operation of edge emitting LEDS.

11. Explain the operation of avalanche photo diode.

OR

12. Explain about optical noises in receivers.

13. What are link power budget and rise time budget analysis? Perform these analysis for a fiber optic link that uses a conventional single mode fiber

OR

14. Discuss different types of system architectures. Suggest the application of each of these topologies.

15. Explain the operation of Raman amplifier.

OR

16. Show that the power conversion efficiency (PCE) of an EDFA, which is defined as $PCE = \frac{Ps,out - Ps,in}{Pp,in}$ is less than unity.

17. a) A soliton transmission system operates at 1550 nm with dispersion length, L_{disp}=202 Km and an effective core area A_{eff}=50μm^2. Find the soliton peak power. Given n_2=2.6x10^{-16} cm^2/W.

    b) Calculate the dispersion length L_{disp} of a soliton transmission system operates at 1550nm with dispersion D=0.5ps/(nm Km) and Ts=20ps.

OR

18. Derive the expression for timing jitter for standard solitons for long haul system.

19. Discuss about WDM system components.

OR

20. Write short notes on AWG and add drop multipliers.