FIBER OPTIC RECEIVER AND MEASUREMENTS

Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration– Probability of Error – Quantum limit.Fiber Attenuation measurements- Dispersion measurements – Fiber Refractive index profile measurements – Fiber cut- off Wave length Measurements – Fiber Numerical Aperture Measurements – Fiber diameter measurements.

PART A

1. List the advantages of using transimpedance front end receiver configuration.
2. State the Significance of maintaining the fibre outer diameter constant
3. Define bit-error rate.
4. Write any two advantages of trans-impedance amplifiers.
5. A digital fiber optic link operating at 1310 nm,requires a maximum BER of 10-8.Identify the average photons per pulse.
6. The photo detector output in a cutback-attenuation set up is 3.3 V at the far end of the fiber.After cutting the fiber at the near end,5m from the far end,photo detector output read was 9.2 V.Recite the attenuation of the fiber in dB/Km?
7. Generalize the error sources of receiver.
8. Give main idea about quantum limit.
9. Express dark current.
10. Summarize the different methods for measuring refractive index profile.
11. Justify the Use of silicon is preferred to make optical receivers.
12. Interpret Modal Noise and Mode partition Noise
13. Calculate the mean of (1/f)noise corner frequency
14. Point out the advantages of preamplifiers.
15. Categorize the types of preamplifiers?
16. Examine the standard fiber measurement techniques?
17. Determine Bend attenuation
18. Why the attenuation limit curve slopes towards to the right?
19. Develop the measures to avoid modal noise.
20. Propose the range of system margin in link power budget.

PART – B

1. Draw the block diagram of fundamental optical receiver. Write about each block.

2. With diagrams describe the following:

(i)Measurement of NA of a fiber (8)

(ii)Measurement of refractive index profile. (8)

3. Explain in brief the blocks and their functions of an optical receiver with schematic diagrams.

4. (i)A digital fiber optic link operating at 850 nm requires amaximum BER of 10^-9.Cite the quantum limit in terms of the quantum efficiency of the detector and the energy of the incidentphoton. (8)

(ii)Define the attenuation and dispersion measurements in detail.(8)

5. (i)Explain any two types of pre amplifiers used in a receiver (12)

(ii)Estimate the terms-Quantum limit and Probability of Error with

respect to a receiver with typical values (4)

6. (i)Give main idea about 'Insertion-Loss method' used for attenuation measurement. (8)

(ii)Express the technique used in Frequency-Domain intermodal Dispersion measurement. (8)

7. (i)List the various types of pre amplifiers available for optical networks and its significance in optical networks. (8)

(ii) Explain any three of them with their circuit diagrams. (8)

8. Demonstrate the following in detail:

(i)Fibre refractive index profile measurement. (8)

(ii)Fibre cutoff wavelength measurement (8)

9. Construct the optical receiver operation and its performance with neat diagram

10. (i) Examine the dispersion and numerical aperture measurements of fibre.

11. (i)Explain in detail about the front end optical amplifiers . (8)

(ii)Considering the probability distributions for received logic 0 and 1 signal pulses,derive the expressions for BER and error function. (8)

12. Analyze the following:

(i)Fibre refractive index profile measurement. (8)

(ii)Fibre cut-off wavelength measurement. (8)

13. Evaluate the error sources of fundamental receiver operations.

Discuss the performance of digital receiver by defining thenprobability of error

14. (a)Develop the schematics of pin photodiode and APD and explain.(8)

(b)Design the fundamental receiver operation in optical communication. (8)