



**WEST BENGAL STATE UNIVERSITY**

B.Sc. Honours 6th Semester Examination, 2022

**ELSADSE04T-ELECTRONICS (DSE3/4)**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.  
Candidates are required to give their answers in their own words as far as practicable.  
All symbols are of usual significance.*

**GROUP-A**

1. Answer any **five** questions from the following: 2×5 = 10
- (a) How the light gets guided in optical fiber?
  - (b) Why passive optical detectors like LDRs are not suitable for optical fiber communication?
  - (c) Distinguish between co-channel interference and adjacent channel interference.
  - (d) Write one advantage and one limitation of Delta Modulation over DPCM.
  - (e) What do you mean by intermodal and intramodal dispersions?
  - (f) What is the frequency range of C-band?
  - (g) What is Ethernet-mobile IP?
  - (h) What is QAM and also mention its limitation?

**GROUP-B**

**Answer any six questions from the following**

5×6 = 30

2. (a) With a neat block diagram, explain an optical fiber communication system. 3+2  
(b) What do you mean by graded index fiber?
3. Draw the simplest block diagram of a C-band satellite transponder and explain the function of each block. 2+3
4. (a) Which type of dispersion of optical fiber depends on the material of the fiber? 1+4  
(b) Consider a step index multimode fiber having core diameter of 500  $\mu\text{m}$ , cladding diameter of 125  $\mu\text{m}$ ,  $n_1 = 1.47$  and  $\Delta = 1.5\%$ . Calculate the modal dispersion for this fiber at  $\lambda = 850 \text{ nm}$ , where the symbols have their usual significance.

5. (a) What are the conditions of orthogonality in a Quadrature Amplitude Modulation (QAM) system?  $2\frac{1}{2}+2\frac{1}{2}$
- (b) How the property of orthogonality can be used to separate signals in a QAM demodulator?
6. (a) A delta modulation system with sampling frequency 256 kHz and the voice bandwidth of 3.4 kHz, is transmitting a voice signal of maximum amplitude 10 volts. Determine the average power of the granular noise and minimum channel bandwidth in bits/sec. (1+1)+3
- (b) Explain the working of an ADM receiver with necessary diagram.
7. (a) What is ARFCN? 1+2+2
- (b) Why data encryption is essential in wireless digital communication?
- (c) Why cellular mobile communication is named so?
8. (a) Explain the different types of transmission losses in satellite communication with necessary expressions. Hence write the link power budget equation. 3+2
- (b) Explain the term 'Sun Transit Outrage'.
9. Explain the terms and their importance in cellular communication system:  
(i) IMEI and (ii) HLR
10. Which type of satellite orbits would you prefer for telephony and broadcast operations? Please explain your answer.

**N.B. :** *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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