



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 μm , cladding diameter of 125 μm , $n_1 = 1.47$ 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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