



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester: IV
Class:SY	Program: B.Tech
Branch Code: ETC	Pattern:2022
Name of Course: Communication Engineering	Course Code:ETC222012
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 pages
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

- 1a) Derive Total power of DSB-FC. An AM signal with carrier of 1KW has 200Watts in each sideband. (6) CO1
Calculate Total power. What is the percentage of modulation?

Question No. 2 Attempt following Question

- 2a) Explain AM super heterodyne receiver in receiver? (6) CO2

Question No. 3 Attempt following Question

- 3a) Encode the bit stream 10000110 into (8) CO3
I) Unipolar NRZ, II) Unipolar RZ, III) Polar NRZ, IV) AMI,
V) Manchester, VI) Polar RZ codes, VII) Polar Quaternary code

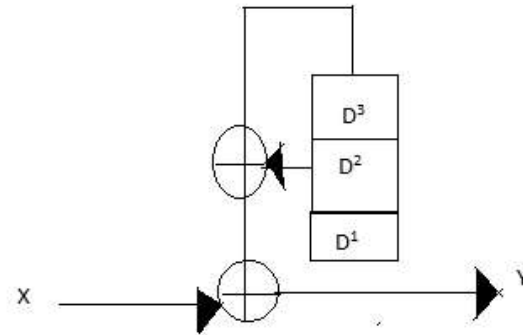
OR

- 3b) Explain DM with the help of transmitter and receiver (8) CO3

- 3c) Discuss the principle of Adaptive Delta modulation in detail with diagram (8) CO3

OR

- 3d) Assuming the initial contents of all the shift registers of the scramblers as shown in the figure to be zero, Find the output Y of the scrambler for an input sequence X given by X=10101011111 (8) CO3



Question No. 4 Attempt following Question

- 4a) Draw the block diagram of QPSK transmitter and QPSK receiver and explain their operation (8) CO4

OR

- 4b) Binary data is transmitted using PSK at a rate 5Mbps over RF link having bandwidth 10MHz. Find signal power required at receiver input so that error probability is less than or equal to 10^{-4} Watt/Hz. $Q(3.71) = 10^{-4}$, $N_0/2 = 10^{-10}$ (8) CO4

- 4c) Explain coherent BPSK reception with suitable diagrams and equations (8) CO4

OR

- 4d) With necessary equations and signal space diagram, obtain the Euclidean distance of FSK systems (8) CO4

Question No. 5 Attempt following Question

- 5a) Show that the random process $x(t) = A \cos(\omega_0 t + \Theta)$ is wide sense stationary, where A and ω_0 are constant, and Θ is a random variable distributed in the range $(0, 2\pi)$. (8) CO5

OR

- 5b) Derive the expression to calculate effective noise for series and parallel connection of resistors (8) CO5

- 5c) Explain the following: (i) Avalanche noise (ii) Burst noise (iii) Flicker noise (iv) Partition noise. (8) CO5

OR

- 5d) Given the resistors, $R_1 = 20\text{K}\Omega$ & $R_2 = 50\text{K}\Omega$, calculate for the bandwidth of 100KHz the thermal noise voltage generated by: (i) R_1 (ii) R_2 (iii) R_1 in series with R_2 (iv) R_1 in parallel with R_2 . (8) CO5

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