

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2023**

**DIGITAL COMMUNICATION**

[Maximum Marks: 75]

[Time: 3 Hours]

**PART-A**

**I. Answer *all* the following questions in one word or one sentence. Each question carries ‘one’ mark.**

**(9 x 1 = 9 Marks)**

		Module Outcome	Cognitive level
1.	Granular noise is observed in----- modulation.	M1.02	R
2.	Define quantisation error.	M1.02	R
3.	Amplitude shift keying is also known as-----	M2.01	R
4.	The digital modulation technique that is most affected by noise is-----	M2.01	U
5.	Channel capacity depends on -----and-----	M3.02	U
6.	Unit of information rate is-----	M3.01	R
7.	Write the names of any two multiple access technologies.	M4.02	R
8.	OFDM uses subcarriers which are-----to each other.	M4.03	U
9.	Define PN sequence.	M4.01	R

**PART-B**

**II. Answer any *eight* questions from the following. Each question carries ‘three’ marks.**

**(8 x 3 = 24 Marks)**

		Module Outcome	Cognitive level
1.	Explain companding.	M1.02	U
2.	Justify the statement - "DPCM reduces the bandwidth requirement as compared to PCM".	M1.02	U
3.	Explain the two major limitations of delta modulation.	M1.02	U
4.	Explain Quantisation. State the relation between the number of levels and bits.	M1.02	U
5.	Explain FDM.	M2.02	R
6.	Differentiate between synchronous and asynchronous transmission.	M2.03	U
7.	Compare BFSK and BPSK.	M2.03	U
8.	The probabilities of five possible outcomes of an experiment are given as: $P(x_1) = \frac{1}{2}, P(x_2) = \frac{1}{4}, P(x_3) = \frac{1}{8}, P(x_4) = P(x_5) = \frac{1}{16}$ Find entropy.	M3.03	A
9.	Write down any three applications of TDM and FDM.	M2.02	R
10.	Compare TDMA and FDMA.	M4.02	U

**PART-C**

**Answer all questions from the following. Each question carries 'seven' marks.**

**(6 x 7 = 42 Marks)**

		Module Outcome	Cognitive level
III.	Explain DPCM transmitter and receiver with the help of a block diagram.	M1.03	U
<b>OR</b>			
IV.	Explain Adaptive Delta Modulation with neat sketches.	M1.02	U
V.	Explain QPSK with the help of block diagram.	M2.01	U
<b>OR</b>			
VI.	Explain TDM with the help of neat sketches. List its advantage and disadvantages.	M2.02	U
VII.	State and explain Shannon-Hartley theorem. A system has a bandwidth of 4kHz and a SNR of 28dB at the input to the receiver. Calculate the information carrying capacity of the system.	M3.02	A
<b>OR</b>			
VIII.	The generator matrix for a (6,3) block code is given below. Find all the code vectors of this code. $\begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$	M3.02	A
IX.	Sketch the state transition diagram for a binary convolution encoder with k=1, n=2 and K =3.	M3.04	A
<b>OR</b>			
X.	Explain a convolutional Encoder with the help of a block diagram. List a few applications of convolutional encoder.	M3.04	U
XI.	Explain the concept of CDMA with necessary waveforms. List its advantages and applications.	M4.02	U
<b>OR</b>			
XII.	Explain Direct sequence spread spectrum with the help of block diagram and necessary waveforms.	M4.03	U
XIII.	Explain CDMA-RAKE receiver with the help of block diagram and necessary waveforms.	M4.01	U
<b>OR</b>			
XIV.	Explain concept and generation of OFDM with neat sketches.	M4.03	U

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