

T.Y. Diploma : Sem. V  
[ET/EN/EJ/EX/ED/EI]  
**Digital Communication**  
Prelim Question Paper



Time: 3 Hrs.]

[Marks : 100

- Instructions :**
- (1) All questions are compulsory.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data if necessary.
  - (5) Preferably, write the answers in sequential order.
1. (a) Attempt any **THREE** of the following : [12]
- (i) Define entropy and state its unit.
  - (ii) State the need of multiplexing and write its type.
  - (iii) State the principle of orthogonality. Explain the concept of single carrier & multi-carrier system.
  - (iv) Why pseudo-noise sequence used in spread spectrum modulation.
- (b) Attempt any **ONE** of the following : [6]
- (i) Draw and explain basic communication system block diagram.
  - (ii) Encode the following Binary data stream into unipolar RZ, unipolar NRZ, Polar Return Zero (RZ), Polar NRZ, AMI and split phase Manchester code Data stream : 10110100101.
2. Attempt any **TWO** of the following : [16]
- (a) Draw and explain the block diagram of Delta Modulation. Also explain slope overload and granular noise in linear delta modulation.
  - (b) Explain principle of QAM with the block diagram. Also draw constellation diagram of 4-QAM.
  - (c) Describe the basic principle involved in CDMA technology with neat sketch. State its any four advantages.
3. Attempt any **FOUR** of the following : [16]
- (a) State limitations of DM. Explain how they overcome in ADM.
  - (b) Explain quantization and quantization error.
  - (c) Draw and Explain QPSK Modulator.
  - (d) Draw the block diagram of DPSK transmitter and state the function of each block.
  - (e) Draw and explain the power spectral density of BPSK.
4. (a) Attempt any **THREE** of the following : [12]
- (i) State two advantages and disadvantages of digital communication system.
  - (ii) With the help of neat sketch explain quantization process.
  - (iii) Using Shannon Hartley theorem, calculate channel capacity for a channel having BW of 15 kHz and signal to noise ratio of 20 dB.
  - (iv) Explain fast frequency hopping with suitable diagram.
- (b) Attempt any **ONE** of the following : [6]
- (i) Explain PN sequence generation in detail.
  - (ii) Generate CRC code for data word 1101010011 the divisor is 01011.
5. Attempt any **TWO** of the following : [16]
- (a) Describe the North American digital multiplexing hierarchy with neat diagram.
  - (b) Draw the block diagram of QAM generation system & explain it with waveform.

(c) Draw the block diagram of Direct sequence spread spectrum and state the function of each block.

6. Attempt any **FOUR** of the following :

[16]

- (a) Draw block schematic of DPCM transmitter and receiver.
- (b) Compare TDM, FDM & CDM (3 points).
- (c) Explain the role of predictor in differential pulse code modulation.
- (d) State the types of errors present in the digital communication system. Also explain the causes and effects of errors.
- (e) Write about M-ary encoding. State any two advantage and disadvantage.

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**T Y Diploma Sem-V: Paper Discussion Schedule**

Branches	Date	Day	Timing	Centres
Electronics Group	8 Nov. 2018	Thursday	9 a.m. to 11 a.m.	Dadar
	8 Nov. 2018	Thursday	12 noon to 2 p.m.	Thane