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Total No. of Questions : 09]

[Total No. of Pages : 02

Paper ID [EC304]

(Please fill this Paper ID in OMR Sheet)

B. Tech. (Sem. - 6th)

DIGITAL COMMUNICATION [EC-304]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

(10 × 2 = 20)

Q1)

- a) What are the advantages of digital communication systems over analog communication systems?
- b) What are the sampling rates of the following signals: voice at 5kHz, high fidelity music at 20 kHz.
- c) In a PCM system, the signal to noise (quantization noise) ratio is to be held to a minimum of 40 dB. Determine the number of quantization levels needed.
- d) Describe the difference between uniform and non-uniform companding.
- e) Explain Nyquist criterion for distortion less base band binary transmission.
- f) Why is clock recovery required in a BPSK demodulator circuit?
- g) What is MSK modulation scheme?
- h) Suggest some pulse shaping filter function to ensure zero intersymbol interference.
- i) State the difference between coherent and non-coherent detection.
- j) Differentiate between unipolar and bipolar signalling.

Section - B

(4 × 5 = 20)

- Q2) What are companding laws? Explain their differences and similarities.
- Q3) Describe delta-modulation (DM) and explain how DM improves the system's tolerance to slope overload?
- Q4) Determine the range of variation for a T1 PCM-TDM system with jitter amplitude of 3 UI and jitter frequency equal to 200 Hz.
- Q5) With the assistance of a block diagram, describe the function of a 16-QAM modulation scheme.
- Q6) Describe M-ary modulation techniques. In what conditions M-ary signalling schemes are preferred over binary signalling schemes.

Section - C

(2 × 10 = 20)

- Q7) Describe FSK modulation scheme using appropriate block diagram. Derive the output voltage relationship and the bandwidth relationship for FSK modulation.
- Q8) (a) How eye patterns are useful for studying intersymbol interference in digital communication systems?
(b) Explain how differential PCM improves system performance.
- Q9) (a) State and explain Shannon's channel capacity theorem.
(b) Sketch the phase-state diagram of a QPSK modulator.