

410707/410807

Roll No. _____

Total No. of Pages: **3**

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B. Tech. IV - Sem. (Main / Back) Exam., (Academic Session 2021- 2022)

Electronics & Communication Engineering

4EC4 – 07/4E14 – 07 Analog and Digital Communication

Common to ECE & EIC

Time: 2½ Hours

Maximum Marks: 120

Min. Passing Marks:

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 6×3 marks = 18 marks.
Candidates have to answer six questions out of ten.

Part – B: Analytical/Problem solving questions 3×10 marks = 30 marks.
Candidates have to answer three questions out of seven.

Part – C: Descriptive/Analytical/Problem Solving questions 3×24 marks = 72 marks.
Candidates have to answer three questions out of five.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL

2. NIL

PART – A

Q1 Why Pulse Code Modulation is a preferred method of modulation for transmission of analog signal?

Q2 List the drawbacks of baseband transmission.

Q.3 What is the importance of Gaussian distribution?

Q.4 What do you mean by quantization?

Q.5 Define noise figure.

Q.6 What are the advantages of digital representation of analog signal?

Q.7 What is Nyquist's criterion?

Q.8 State types of angle modulation.

Q.9 What type of modulation is used in TV for sound and picture transmission?

Q.10 What is the ideal bandwidth of an FM wave?

PART – B

Q.1 Discuss AM vestigial sideband (VSB) transmitter and generation of VSB signal. Also, state the advantages of VSB.

Q.2 Write different properties of probability and explain.

Q.3 Compare Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM). <https://www.btubikaner.com>

Q.4 The output signal-to-quantizing-noise ratio $(SNR)_0$ in a PCM system is defined as the ratio of average signal power to average quantizing noise power. For a full-scale sinusoidal modulating signal with amplitude A, show that -

$$(SNR)_0 = \frac{3}{2} L^2 \text{ and } (SNR)_{0dB} = 1.76 + 20 \log L$$

Where L is the number of quantizing levels.

Q.5 Discuss Coherent Binary Frequency Shift keying (BFSK). Explain generation of BFSK using block diagram.

Q.6 Explain optimum filter and matched filter.

Q.7 Briefly discuss the probability of errors in different signaling scheme (viz. PSK, QPSK, MSK, FSK, etc.).

PART – C

- Q.1 (a) Briefly, discuss line coding and its properties.
- (b) Prove that the output signal of a matched filter is proportional to a shifted version of the autocorrelation function of the input signal to which the filter is matched.
- Q.2 What is Inter Symbol Interference (ISI)? Explain different aspect of ISI using baseband binary data transmission system. Show that, in the absence of ISI and noise the i^{th} transmitted bit is decoded correctly.
- Q.3 (a) Briefly, discuss the requirements of FM detectors. List different FM detection method.
- (b) Explain super-heterodyne AM receiver using suitable block diagram. Also, explain why the usual AM radio receiver uses a super-heterodyne system?
- Q.4 Discuss delta modulation using suitable block diagram and waveform. How adaptive delta modulation is different compared to linear DM?
- Q.5 Discuss essential elements of baseband digital communication system. How digital communication system is different compared to analog communication system?

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