

4E1230

Roll No. _____

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B. Tech. IV - Sem. (Main) Exam., May - 2019

ESC Information Technology

4IT3 – 04 Principle of Communication

Time: 3 Hours

Maximum Marks: 120

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

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

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

Q.1 ✓ What do you mean by the analog and digital communication?

Q.2 ✓ Write the expression for power relation in AM value.

Q.3 ✓ What is the BW for AM wave?

Q.4 ✓ What is carrier swing?

Q.5 ✓ What is Carson's rule?

Q.6 ✓ What do you mean by Nyquist rate?

Q.7 ✓ What do you mean by Quantization?

Q.8 ✓ Explain the importance of delta modulation.

Q.9 ✓ What do you mean by inter symbols interference?

Q.10 ✓ Write the advantages and limitations of NRZ codes.

$$\frac{A^2}{2} [1 + \mu^2]$$
$$\frac{A^2}{2} + \frac{mA_c^2}{2} + \frac{mA_c^2}{2}$$
$$A^2 [1 + \frac{\mu^2}{2}]$$

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PART - B

[5×8=40]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1 In an AM system, the modulating signal is sinusoidal with frequency f_m Hz. If 80% modulation is used, then find the ratio of total side band power in the modulation signal, to the total power.
- Q.2 Draw the circuit diagram of generation of PPM signal. Write the advantage of PPM. *Advantage*
- Q.3 What are the properties of PN sequence? Explain the method of generation of PN sequence with suitable diagram / circuit.
- Q.4 Draw the block diagram of ADM. Explain its working and compare it with PCM. *ADM*
- Q.5 For a FSK system the following data are observed, transmitted binary data rate = 2.5×10^6 bits/sec, PSD of noise = 10^{-20} Watt/Hz, Amplitude of received signal = $1 \mu\text{V}$. Determine the average probability of symbol error assuming coherent detection.
- Q.6 Explain the Quadrature Phase Shift Keying (QPSK) modulation technique. Draw the schematic diagram of QPSK transmitter and receiver and explain the working. *QPSK*
- Q.7 Explain pre-emphasis and de-emphasis in FM broadcasting.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

- Q.1 Explain with the help of block diagram the binary PSK transmitter and receiver. Show that the average probability of symbol error for coherent binary PSK equals-

$$P_c = \frac{1}{2} \operatorname{erfc} \sqrt{\frac{E_b}{N_0}}$$

Q.2 Sketch the waveform for each of the following codes for the bit stream 1011101011

- (a) Unipolar RZ
- (b) Bipolar RZ
- (c) Unipolar NRZ
- (d) Bipolar NRZ
- (e) Split phase Manchester

Q.3 Draw and explain the working of delta modulation. For a delta modulation system find the maximum output signal to noise ratio for sinusoidal modulation under the assumption of no slope overload. The receiver contains a low pass filter at its output end having bandwidth equal to the message bandwidth.

Q.4 What is SSB modulation? Describe various methods of generation of SSB-SC signal.

Q.5 What is meant by spreading a signal? What are the modulation techniques used in FHSS system?

low
freq