

**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. NIL2. NIL

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**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.

## **PART – B**

**(Analytical/Problem solving questions)**

**[5×8=40]**

**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. [ersahilkagyan.com](http://www.ersahilkagyan.com)
- Q.2 Draw the circuit diagram of generation of PPM signal. Write the advantage of PPM.
- Q.3 What are the properties of PN sequence? Explain the method of generation of PN sequence with suitable diagram / circuit. <http://www.rtuonline.com>
- Q.4 Draw the block diagram of ADM. Explain its working and compare it with PCM.
- Q.5 For a FSK system the following data are observed, transmitted binary data rate =  $2.5 \times 10^6$  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.
- 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-

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

**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. <http://www.rtuonline.com>

**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?

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