

Total No. of Questions : 8]

SEAT No. :

PC2799

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[Total No. of Pages : 2

S.E. (Electronics /E & TC) / (Electronics and Computer)

PRINCIPLES OF COMMUNICATION SYSTEMS

(2019 Pattern) (Semester- IV) (204193)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Differentiate Between NBFM and WBFM. [6]

b) Draw and explain the block diagram of super heterodyne FM receiver. [6]

c) FM wave is represented by following equation, [6]

$$V = 10 \sin [10^8 t + 3 \sin 10^4 t] \text{ calculate}$$

- i) Carrier and modulating frequency
- ii) Modulation index and frequency deviation
- iii) Power dissipated by FM wave in 100Ω resistor

OR

Q2) a) Explain with suitable diagram importance of pre-emphasis and de-emphasis. [6]

b) What are methods of FM generation? Explain any one in detail. [6]

c) An angle modulated signal is described by the equation [6]

$$V = 10 \cos (2\pi * F_c * t + 4 \sin 2\pi * F_m * t)$$

$$F_c = 10 \text{ MHz, } F_m = 1,000 \text{ Hz}$$

- i) Determine Modulation index and transmitted signal bandwidth.
- ii) If  $F_m$  is doubled, Determine Modulation index and transmitted signal bandwidth.

Q3) a) Explain types of sampling with waveform. [6]

b) Explain with block diagram and waveforms generation of PAM. [6]

c) Find the Nyquist rate and Nyquist interval for the following signal [5]

$$X(t) = 3 \cos (200\pi t) + 5 \sin (6000 \pi t) + 10 \cos (1200 \pi t)$$

OR

Q4) a) Compare PAM, PWM and PPM [6]

b) What is aliasing and Draw a spectrum showing aliasing and guard band. [6]

c) Explain Principles of time division multiplexing? Why synchronization is needed in TDM system. [5]

P.T.O.

- Q5)** a) Draw and explain Block diagram of DM Transmitter. [6]  
 b) What are different types of Quantization? Explain any one method of quantization with neat diagram. [6]  
 c) What is necessity of companding? Explain A law companding in detail. [6]

OR

- Q6)** a) Draw and explain Block diagram of Adaptive delta modulation. [6]  
 b) Compare PCMDM and ADM. [6]  
 c) Explain need of digital communication. [6]

- Q7)** a) Draw the following data formats for bit stream 10110100101 [5]  
 i) Unipolar RZ  
 ii) Unipolar NRZ  
 iii) polar RZ  
 iv) Polar NRZ  
 v) split phase Manchester  
 b) What is equalizer? Explain Adaptive Equalizer. [6]  
 c) What is inter symbol Interference (ISI)? Explain methods to eliminate it. [6]

OR

- Q8)** a) Draw and explain CCIT hierarchy multiplexing system. [6]  
 b) Explain need of synchronizer in digital multiplexing. Explain frame synchronization. [6]  
 c) The data stream [1 1 1 1 1] is given to scrambler shown below. Determine the output sequence of scrambler. Assume initial contents of register to be zero. [5]

