

B. TECH. SEM -V (E & TC ENGG.) (2014 COURSE) (CBCS) :
WINTER - 2017

SUBJECT: DIGITAL COMMUNICATION

Day: Tuesday
Date: 16/01/2018

W-2017-2172

Time: 02.30 PM TO 05.30 PM
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.

- Q.1 a)** What is Differential Pulse code modulation (DPCM)? Explain with neat diagram. (06)
- b)** What is companding? (04)

OR

- Q.1 a)** Derive equation for quantization noise and signal to Noise ratio in PCM. (05)
- b)** A Delta modulator system operates at 3 times Nyquist rate for signal with 3.3KHz bandwidth. The quantization step 200mV. Determine the maximum amplitude of 1KHz input sinusoidal for which DM does not show slope overload. (05)

- Q.2 a)** The joint Probability function of two random variables X and Y is given by. (08)
- $$f(x,y) = c(x+3y) \quad \begin{matrix} x = 1,2 \\ y = 0,1,2 \\ \text{otherwise} \\ = 0 \end{matrix}$$
- Find: i) value of C ii) $E(X^2)$ iii) $E(Y)$
- b)** Define the terms: (02)
- i) Co-variance ii) Ergodic Process

OR

- Q.2 a)** Find out cumulative Distribution function of Gaussian Random Variable. (07)
- b)** What is Auto correlation function of Random Process? (03)
- Q.3 a)** What is need of scrambling the data? Explain Scrambling and descrambling process. (07)
- b)** What are the desirable properties of line coding formats? (03)

OR

- Q.3 a)** With block diagram explain operation of early late bit synchronizer. (06)
- b)** Draw following line coding formats for bit stream 0110110010 (04)
- i) Bipolar RZ ii) Polar NRZ
iii) Split phase Manchester iv) Unipolar NRZ

- Q.4 a)** With neat diagram explain BFSK transmitter and receiver? (07)
- b)** Compare BPSK and QPSK system. (03)

OR

- Q.4 a)** What is Differential phase shift keying (DPSK)? Explain with diagram and waveform transmitter and receiver. (08)
- b)** What is MSK? (02)

- Q.5 a)** What is matched filter? (03)
- b)** Derive expression for Probability of error for matched filter. (07)

OR

- Q.5 a)** Derive an expression for Probability of error for BPSK. (06)
- b)** Write short note on optimum filter. (04)

- Q.6 a)** What is multiple Access Techniques? Explain its various types. (07)
- b)** Describe notion of spread spectrum. (03)

OR

- Q.6 a)** What is Direct sequence spread spectrum (DSSS)? (07)
- b)** How PN sequences are generated. (03)