

**B.Tech. SEM -V (E & TC Engg.) 2014 Course (CBCS) : SUMMER - 2019**  
**SUBJECT : DIGITAL COMMUNICATION**

Day      Monday  
Date:    13/05/2019

S-2019-2702

Time : 10.00 AM TO 01.00 PM  
Max. Marks : 60

**N. B. ;**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Assume suitable data, if necessary.

- Q.1**
- a) Derive the expression for maximum signal to noise ratio in PCM system. (06)
  - b) Explain speech synthesis using LPC. (04)

**OR**

- a) What is DPCM? Explain in detail. (06)
- b) Write a short note on quantization (04)

- Q.2**
- a) What is autocorrelation? State properties of autocorrelation function. (06)
  - b) Marginal power density functions of two random variables X and Y : (04)

$$f_x(x) = \begin{cases} 4(1-x)^2 & 0 \leq x \leq 1 \\ 0 & \text{elsewhere} \end{cases}$$

$$f_y(y) = \begin{cases} 4(1-y)^2 & 0 \leq y \leq 1 \\ 0 & \text{elsewhere} \end{cases}$$

**OR**

- a) What is cross correlation function? State properties of cross correlation function. (06)
  - b) Define power spectral density and energy spectral density. (04)
- Q.3**
- a) What is need of equalization? Explain any one type of equalizer. (06)
  - b) State properties of line codes. (04)

**OR**

- a) 30 voice channels of 4 KHZ bandwidth, is sampled at nyquist rate and encoded into 8 bit PCM are multiplexed with 1 bit/frame as synchronization bit. What is resultant bit rate at the output of multiplexer? Sketch the frame configuration. (06)
- b) What is need of scrambler? (04)

**P. T. O.**

Q.4 a) With the help of block diagram explain DPSK system. (06)

b) Explain block diagram of FSK generator with neat waveforms. (04)

OR

a) What is QAM? Explain in detail. (06)

b) Explain block diagram of PSK receiver with neat waveforms. (04)

Q.5 a) Derive equation for error of probability of BFSK. (06)

b) State properties of matched filter. (04)

OR

a) Derive equation for error of probability of BPSK using matched filter. (06)

b) Derive an equation of integrate and dump filter. (04)

Q.6 a) What is multiple access techniques? Explain its various types. (06)

b) Explain performance parameters of DSSS system? (04)

OR

a) Explain block diagram of DSSS system. (06)

b) Explain fast frequency hopping spectrum. (04)

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