

3 (Sem-5) ELE M 3

2017

ELECTRONICS

(Major)

Paper : 5.3

(Digital Communication)

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Choose the correct answer : $1 \times 5 = 5$

(a) The process of converting the analog sample into discrete form is called

(i) modulation

(ii) multiplexing

(iii) quantization

(iv) sampling

(b) The modulation techniques used to convert analog signal into digital signal are

(i) pulse code modulation

(ii) delta modulation

(iii) adaptive delta modulation

(iv) All of the above

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(Turn Over)

(c) In PCM, the parameter varied in accordance with the amplitude of the modulating signal is

- (i) amplitude
- (ii) frequency
- (iii) phase
- (iv) None of the above

(d) In delta modulation

- (i) one bit per sample is transmitted
- (ii) all the coded bits used for sampling are transmitted
- (iii) the step size is fixed
- (iv) Both (i) and (iii) are correct

(e) The maximum bandwidth is occupied by

- (i) ASK
- (ii) BPSK
- (iii) FSK
- (iv) None of the above

2. Answer the following in brief : $2 \times 5 = 10$

- (a) Define the terms 'correlation' and 'covariance' of a random process.
- (b) What do you mean by sampling? State the two principles of sampling theorem.
- (c) What is companding? What is its importance in PCM system?
- (d) Sketch the binary ASK waveform for the bit sequence 100110011.
- (e) What is spread spectrum modulation? How is it different from other digital modulation schemes?

3. Answer any seven from the following : $5 \times 7 = 35$

- (a) Draw the block diagram of a digital communication system. Explain the working of each block in detail. Give a comparison between analog communication and digital communication systems.
- (b) Discuss the generation of coherent detection of QPSK signal with functional block diagram.

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- (c) What is ergodic process? Discuss the transmission of a random process through linear time invariant filter.
- (d) How is a pseudonoise sequence generated? Illustrate with block diagram how they are used in spread spectrum techniques.
- (e) Draw the waveforms of PSK and QPSK for the sequence "0101100". How is QPSK advantageous over PSK? Discuss the working of a PSK modulator.
- (f) Draw the block diagram of PCM system. What is the importance of quantization in PCM system? What are the different encoding schemes used in PCM system?
- (g) What is orthogonal frequency division multiplexing? How is it different from conventional FDM? Give a comparison between FDM and TDM.
- (h) What is minimum shift keying? Discuss briefly about the signal space diagram of MSK techniques.

(5)

- (i) What is the importance of differential PCM? Discuss the block diagram of DPCM transmitter and receiver system.
- (j) Discuss briefly about pulse amplitude modulation technique. What is flat-top sampling in PAM signal?
4. Write short notes on any *two* of the following : 5×2=10
- (a) Direct sequence spread spectrum
- (b) CDMA based wireless communication system
- (c) GSM based wireless communication system
