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**Question Paper Code : 91451**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth Semester

Electronics and Communication Engineering

EC 6501 – DIGITAL COMMUNICATION

(Regulations 2013)

(Common to : PTEC 6501 – Digital Communication for B.E. (Part-Time) – Fourth Semester – Electronics and Communication Engineering – Regulations 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Give the basic building blocks of a digital communication system.
2. What does absolute bandwidth refers to ?
3. Define sampling theorem.
4. Why adaptive delta modulation is superior to DPCM ?
5. What do the various autocorrelations co-efficient represent in the power spectral density expression of a line code ?
6. Draw the neat diagram of eye pattern free from ISI.
7. Draw PSK and QPSK waveforms of the bit stream 11110001.
8. Give the merits of QAM.
9. Define channel coding theorem.
10. List some of the merits of linear block codes.

PART – B

(5×13=65 Marks)

11. a) State sampling theorem and explain the sampling process analytically. Provide required diagrams.

(OR)

- b) i) Derive the expression for signal to noise ratio of uniform quantizer. (6)
- ii) Write short notes on aliasing and signal reconstruction. (7)



12. a) Illustrate and describe the types of various linear predictive coding techniques. (OR)
- b) With a neat block diagram explain the operation of adaptive delta modulation.
13. a) Derive and plot the power spectrum of NRZ unipolar and bipolar format signal. (OR)
- b) What is ISI ? List the various methods to remove ISI in communication system. Justify them.
14. a) i) Draw and explain the quadrature receiver structure for coherent QPSK. (5)
- ii) Draw the signal space diagram of a coherent QPSK modulation system and also find the probability of error if the carrier takes any one of the equally spaced values  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$  and  $270^\circ$ . (8)
- (OR)
- b) Elaborate on carrier synchronization with required diagrams. Justify as how it ensures reliability.
15. a) i) Find the (7, 4) systematic and non-systematic cyclic code word of the message word 1101. Assume the generator polynomial as  $1 + x^2 + x^3$ . (8)
- ii) Obtain the code for an (n, k) linear cyclic code and explain its working principle. (5)
- (OR)
- b) Draw the code tree of a convolution code of code rate  $r = 1/2$  and constraint length of  $K = 3$  starting from state table and state diagram for an encoder which is commonly used. (13)

## PART - C

(1×15=15 Marks)

16. a) Prove that a Vitterbi decoding process is more efficient than any other linear block code. Analyse it with suitable illustration. (15)
- (OR)
- b) Starting from the Geometric representation of the BPSK signal, analyse the constellation diagram of BPSK, its euclidean distance and the error probability expression. (15)