PVP 19

Code: 19EC4501A

III B.Tech - I Semester – Regular Examinations – JANUARY 2022

DIGITAL COMMUNICATIONS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place

PART – A

1. a) Define PCM. Explain its limitations.
   b) Explain the Probability of error of QPSK signals.
   c) Draw the receiver of frequency-hop spread frequency shift keying.
   d) Explain the concept of channel capacity briefly.
   e) Mention any two error control coding techniques and explain them briefly.

PART – B

UNIT – I

2. a) Discuss about unipolar nonreturn-to-zero (NRZ) signaling, polar nonreturn-to-zero signaling, Unipolar return-to-zero (RZ) signaling, Bipolar return-to-zero (BRZ) signaling. 6 M
   b) Twelve different message signals, each with a bandwidth of 10KHz are to be multiplexed and transmitted. Determine the minimum bandwidth

required for each method if the multiplexing/ modulation method used is

i) FDM, SSB

ii) TDM, PAM 6 M

OR

3. a) Discuss about the differential pulse code modulation in detail. 6 M

b) Explain raised cosine spectrum in detail. 6 M

UNIT – II

4. a) Explain generation and detection of coherent binary PSK signals. 6 M

b) Explain generation and detection of differential phase shift keying. 6 M

OR

5. Explain coherent detection of signals in noise. 12 M

UNIT-III

6. Discuss about pseudo noise sequences in detail. 12 M

OR

7. a) A single-tone jammer

$$j(t) = \sqrt{2J}\cos(2\pi f_c t + \theta)$$

Is applied to a BPSK system. The N-dimensional transmitted signal $x(t)$ is described by $x(t)=c(t)s(t)$. Find the Frequency co-ordinates of the jamming signal j(t). 6 M

b) Explain Anti jam characteristics and processing gain in detail. 6 M

UNIT – IV

8. a) What is the ultimate transmission rate for reliable communication over the noise channel? 6 M

   b) Write the implication of information capacity theorem. 6 M

OR

9. a) Write short notes on
      i) Uncertainty
      ii) Information
      iii) Entropy 6 M

   b) A source emits one of four symbols S_0, S_1, S_2 and S_3 with probabilities $1/3$,$1/6$, $2/8$ and $1/4$. The successive symbols emitted by the source are statistically independent. Calculate the entropy of the source. 6 M

UNIT – V

10. Explain the Trellis coding in detail. 12 M

OR

11. a) Explain cyclic and convolution codes in detail. 6 M

    b) The generator polynomial of a (15,11) Hamming code is defined by

$$g(x)=1+x+x^3$$

develop the encoder and syndrome calculator for this code using a systematic form. 6 M