BE-sem-IV-old-computers

ADC 10/12/15

QP Code : 1451

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**
(2) Solve **any four** out of remaining **six** questions.

1. Solve **Any four :** 20
   (a) In relation with FM, explain.
      (i) maximum frequency deviation
      (ii) modulation index
      (iii) frequency spectrum and banwidth
   (b) Write shannon's channel capacity theorem and explain.
   (c) Compare TDM & FDM methods of multiplexing.
   (d) List advantages of digital communication systems.
   (e) Explain the terms code word, code rate & hamming distance.

2. (a) Draw & explain the block diagram of PCM System. 10
   (b) Compare PCM, DM, ADM Systems. 10

3. (a) Explain the functioning of BPSK transmitter and receiver with the help of neat diagram. Draw necessary waveforms to explain the BPSK System. 10
   (b) A voice signal is band limited to 3.4 KHz is to be transmitted using PCM System Signaling rate of PCM is not to exceed 36000 bits/sec. 5
      Find (a) Approximate value of fs
      (b) Number of quantization levels
      (c) Number of bits per word N.
   (c) A carrier wave of amplitude 10 V and frequency 100KHz is frequency modulated by sinusoidal voltage The modulating voltage has an amplitude of 5V and frequency fm = 20 KHz. 5
   The frequency deviation constant is 2KHz/Volt. Draw frequency spectrum of FM wave.

4. (a) In (6, 3) linear block code, 10
   If generator matrix

$$G=\begin{bmatrix}1 & 0 & 0 & 1 & 1 & 0\\ 0 & 1 & 0 & 0 & 1 & 1\\ 0 & 0 & 1 & 0 & 1 & 0\end{bmatrix}$$

   (i) Construct all possible codwords
   (ii) Write down parity check matrix H.
   (iii) What is syndrome S.

(b) Information source emits one of four possible symbols once every ms interval. The symbols occur with probabilities 10

$P_1 = 0.4$
$P_2 = 0.3$
$P_3 = 0.2$
$P_4 = 0.1$

(i) Find the information content of each of these messages.
(ii) Find Entropy (H)
(iii) Information rate R.

5. (a) Derive the mathematical expression for the spectrum of AM wave and plot it. 10
(b) Draw the block diagram of superheterodyne receiver and explain in detail. 10

6. (a) Draw the block diagram of Armstrong frequency modulation system and explain the functions of mixer and multiplier. 10
(b) A sinuscidal carrier has an amplitude of 10v and frequency 100KHz. It is amplitude modulated by sinusoidal voltage of 3 V and frequency 500 Hz. Modulated voltage is developed across 75 Ω resistance 10

(a) Write equation of modulated wave
(b) Find modulation index
(c) Draw spectrum of moduated wave
(d) Calculate average power
(e) Calculate power carried by sidebands

7. (a) Explain the principle operation of Time division Multiplexing (TDM) system with diagram. 10
(b) Write short notes on **any two** 10

(i) ASK, FSK, PSK techniques
(ii) VSB
(iii) PAM & PWM
(iv) FDM
