

(OLD COURSE)QP Code : **14430****(3 Hours)****[Total Marks : 100**

- N. B. :** (1) Question No. 1 is compulsory.
 (2) Solve **any four** out of remaining **six** question.
 (3) Figures to the **right indicate** full marks.

1. Attempt any **FOUR**.
- (a) What is frequency modulation? Write mathematical expression for the same. **5**
 (b) Define amplitude modulation and draw modulating, carrier and AM wave form. **5**
 (c) B.W of video signal is 4.5 MHz, signal to be transmitted using PCM with no. of quantification levels $Q=1024$. Sampling rate should be 20% higher than Nyquist rate. Calculate system bit rate. **5**
 (d) List advantages of digital communication. **5**
 (e) Write Shannon's channel capacity theorem and explain. **5**
2. (a) Derive mathematical expression for spectrum of AM wave and Plot it. **10**
 (b) A 10 KW carrier wave is amplitude modulated at 80% depth of modulation by a sinusoidal modulating signal calculate the sideband power, total power and transmission efficiency of AM wave. **10**
3. (a) Explain BPSK modulation method. Show graphical representation of BPSK signal. **10**
 (b) Draw block diagram of BPSK generator and explain. **10**
4. (a) Explain the principle operation of time division multiplexing system with appropriate diagram. **10**
 (b) Three signals having data rate of 2 kbps are grouped together by means of TDM, each unit consists of 1 bit. **10**
- Calculate :-**
- (i) Bit duration before multiplexing
 (ii) Transmission rate of TDM
 (iii) Duration of each time slot in TDM
 (iv) Duration of one TDM frame
5. In (6,3) Linear block code, if generator matrix G **20**

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

- (i) Construct all possible code words
 (ii) Write down parity check matrix
 (iii) Explain how to find out syndrome S for any given data.