

COURSE CODE: 10B11EC514

MAX. MARKS: 35

COURSE NAME: Communication Systems

COURSE CREDITS: 04

MAX. TIME: 2 HRS.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Attempt all parts of a question together.

Q1(a) State Sampling Theorem. Derive how will you recover the original signal back from the sampled signal? [1+3= 4 Marks]

(b) Twenty four voice signals are sampled uniformly and then have to be time division multiplexed. The highest frequency component for each voice signal is 3.4 kHz.

(i) If the signals are pulse amplitude modulated using Nyquist sampling rate, what would be the minimum channel bandwidth required?

(ii) If the signals are pulse code modulated with an 8 bit encoder, what would be the sampling rate?

The bit rate of the system is given as 1.5×10^6 bits/sec. [1.5+1.5= 3 Marks]

Q2(a) With the help of suitable example describe any one method of generation of Pulse Position Modulated signal. [2 Marks]

(b) How can original signal be retrieved from Pulse Width Modulated signal? [2 Marks]

(c) In a frequency modulated system, a 7 kHz modulating signal modulates 107.6 MHz carrier wave so that the frequency deviation is 50 kHz. Find:

(i) carrier swing in the FM signal and modulation index.

(ii) the highest and the lowest frequencies attained by the FM signal. [1.5+1.5= 3 Marks]

Q3(a) How does DPCM scheme work? Draw the diagram of DPCM transmitter. [2+2=4 Marks]

(b) Describe the Phase Shift Method of SSB-SC generation. [3 Marks]

Q4(a) With the help of suitable diagrams explain the transmitter and receiver used for Frequency Shift Keying. [4 Marks]

(b) State Shannon's channel capacity theorem. Calculate the data rate for a standard telephone line circuit with SNR 30dB and bandwidth of 2.7 kHz. [1+2= 3 Marks]

Q5(a) Explain Delta Modulation. Elaborate the drawbacks of Delta Modulation. [2+2=4 Marks]

(b) Represent 10111010 with the help of following line codes:

(i) Unipolar NRZ

(ii) Bipolar NRZ

(iii) Unipolar RZ

(iv) Bipolar RZ

(v) Manchester

(vi) Differential Code [3 Marks]
