BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)
B.Tech.Sem - IV E&C :SUMMER- 2022
SUBJECT : DIGITAL COMMUNICATION

Day : Tuesday   Time : 10:00 AM-01:00 PM

Date : 14-06-2022   **S-24601-2022**   Max. Marks : 60

N.B.:
1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw diagrams wherever necessary.
4) Use of Scientific Calculator is allowed

Q.1 What is the meaning of sampling? Explain in detail types of sampling with **(10)** suitable diagram and waveforms.

OR

Q.1 a) Differentiate PAM, PWM and PPM. **(05)**

b) Explain PWM transmitter with suitable block diagram and waveform. **(05)**

Q.2 Explain in detail delta modulation transmitter and receiver with suitable block **(10)** diagram and mathematical expressions.

OR

Q.2 a) A compact CD disc records the audio signal using PCM. Assume Audio signal **(06)** of 10KHz. Calculate

    i) Nyquist rate fs

    ii) If Nyquist samples are quantized into 17000 levels. Identify the no. of binary digits to encode a sample

    iii) Signalling rate (Bit date)

b) Discuss the different noise effects in detail **(04)**

Q.3 Find error probability of coherent FSK when amplitude of input at coherent **(10)** optimal receiver is 10mv and frequency 1MHz the signal corrupted with white noise of PSD 10^{-9} W/Hz. The data rate is 100 kbps.
[erfc(1.01)=0.1531, erfc (1.11) = 0.1164, erfc(1.22) = 0.0844 and erfc(1.33) = 0.0599]
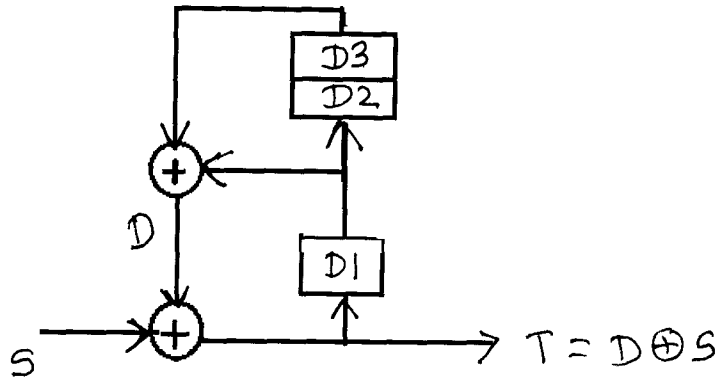
OR

Q.3 Draw and explain the block diagram of BPSK modulator with suitable **(10)** mathematical expressions in detail.

Q.4 Explain the working principal of scrambling and unscrambling (Descrambling) **(10)** with neat diagram.

OR

Q.4 Design the corresponding scrambles. If a sequence S= 1010101000111 is **(10)** applied to the input of this scrambler, determine the output sequence T.

Q.5 Explain error probability of BPSK. **(10)**

OR

Q.5 Explain the properties of matched filter. **(10)**

Q.6 Explain FHSS transmitter and receiver in detail with neat diagram **(10)**

OR

Q.6 A spread spectrum communication system has the following parameters. **(10)** Information bit duration, Tb = 4.095ms, PN chip duration, Tc = 1μs. Find the processing gain. What is the number of shift register required? Also find the jamming margin if Eb/No = 10 for BPSK scheme.

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