DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary End Semester Examination – Summer 2022

Course: B. Tech. **Branch : E&TC** **Semester : VII**

Subject Code & Name: BTETC701 Digital Communication

Max Marks: 60 **Date:13/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:
1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	**With neat block diagram, explain basic digital communication system.**	Level 4/CO3	**6**
B)	**State any six advantages of Digital Communication over Analog Communication.**	Level 3/CO2	**6**
C)	**Attempt following questions**	Level 4/CO3	**6**
	a. **State sampling theorem**		
	b. **What is meant by aliasing effect**		
	c. **What is meant by a Random Process**		
Q.2	**Solve Any Two of the following.**		
A)	**Given the data stream 101001110010, sketch the transmitted sequence of pulses for each of the following line codes:** **Unipolar NRZ** **Polar RZ** **Manchester code**	Level 2/CO2	**6**
B)	**State and explain properties of Autocorrelation and Crosscorrelation**	Level 3/CO2	**6**
C)	**Let $Y(t)$ be the output of an LTI system with impulse response h(t), when X(t) is applied as input. Show that**	Level 1/CO2	**6**

a) $R_{XY}(t_1, t_2) = \int_{-\infty}^{\infty} h(\beta) R_{XX}(t_1, t_2 - \beta) d\beta$

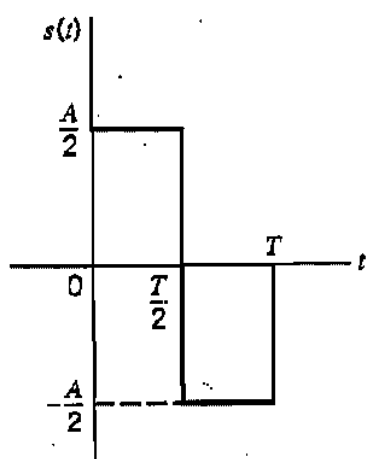b) $R_{YY}(t_1, t_2) = \int_{-\infty}^{\infty} h(\alpha) R_{XY}(t_1 - \alpha, t_2) d\alpha$

Q. 3	**Solve Any Two of the following.**		
A)	**Define Mean, Correlation, and Covariance functions.**	Level 4/CO2	**6**
B)	**Determine the output SNR in a Delta Modulation system for a 1-kHz sinusoid, sampled at 32 kHz, without slope overload, and followed by a 4-kHz post reconstruction filter.**	Level 2/CO2	**6**

C) For signal s(t) shown in the figure   Level 2/CO1   **6**

   a. Determine the impulse response of a filter matched to this signal and sketch it as a function of time.

   b. Plot the matched filter output as a function of time.

   c. What is the peak value of the output?

Q.4 Solve following questions.

A) With neat block diagram explain Noncoherent Detection of BFSK signals.   Level 3/CO1   **6**

B) A pseudo random sequence is generated using a feedback shift register of length m=4. The bit rate is 107 bits per second. Find the following   Level 2/CO1   **6**

   a. Psuedo Noise sequence length

   b. Bit duration of Psuedo Noise sequence

   c. Psuedo Noise sequence period

Q. 5 Solve Any Two of the following.

A) Explain in detail the term Inter symbol Interference   Level 3/CO4   **6**

B) Draw and explain Frequency Hop Spread Transmitter and Receiver.   Level 4/CO4   **6**

C) Draw and explain the transmitter and receiver of delta modulation. What is meant by slope overload distortion?   Level 3/CO3   **6**

*** End ***