

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:

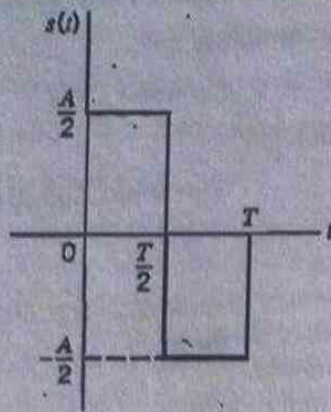
1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and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

- Q.1 Solve Any Two of the following. (Level/CO) Marks
- 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: Level 2/CO2 6
- Unipolar NRZ
- Polar RZ
- Manchester code
- 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



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

- Pseudo Noise sequence length
- Bit duration of Pseudo Noise sequence
- Pseudo 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.

Level 3/CO3

6

What is meant by slope overload distortion?

*** End ***