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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B.Tech III Year I Semester Supplementary Examinations August-2021**

**DIGITAL COMMUNICATIONS**

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

**PART-A**

(Answer all the Questions 5 x 2 = 10 Marks)

- |   |   |  |    |
|---|---|--|----|
| 1 | a | Differentiate Encoding and Decoding                  | 2M |
|   | b | What do you mean an Eye pattern?                     | 2M |
|   | c | What is orthogonal basis function?                   | 2M |
|   | d | Define digital modulation techniques and its purpose | 2M |
|   | e | What is Generator matrix?                            | 2M |

**PART-B**

(Answer all Five Units 5 x 10 = 50 Marks)

**UNIT-I**

- |   |   |   |    |
|---|---|---|----|
| 2 | a | Explain the DPCM system with neat diagram. Pros and cons of DPCM.   | 6M |
|   | b | A Television signal having a bandwidth of 4.2 MHz is transmitted using binary PCM system. Given that the number of quantization levels is 512. Determine (i) Codeword length (ii) Transmission Bandwidth (iii) Final Bit rate (iv) Output SNR ratio | 4M |

**OR**

- |   |   |  |    |
|---|---|--|----|
| 3 | a | Describe PCM system and discuss the Noise considerations in PCM systems.   | 6M |
|   | b | Consider an audio signal consisting of the sinusoidal term given as $x(t) = 3\cos(500\pi t)$<br>(i) Determine the SNR noise ratio. When this is quantized using 10 bits PCM.<br>(ii) How many bits of quantization are needed to achieve a SNR ratio of at least 40dB? | 4M |

**UNIT-II**

- |   |   |   |    |
|---|---|---|----|
| 4 | a | Discuss in detail about Inter symbol interference and its effects   | 5M |
|   | b | Derive the expression for the Nyquist criterion for distortion less baseband transmission in the absence of noise in terms of time domain & Frequency domain. | 5M |

**OR**

- |   |   |   |    |
|---|---|---|----|
| 5 | a | Derive the expression for impulse response of a matched filter.   | 5M |
|   | b | Give a brief explanation on modified duo binary signaling scheme. | 5M |

**UNIT-III**

- |   |   |   |    |
|---|---|---|----|
| 6 | a | Illustrate optimum receiver for AWGN channel. | 5M |
|   | b | Explain the concept of Schwarz Inequality     | 5M |

**OR**

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|---|---|---|----|
| 7 | a | What is Gram-Schmidt orthogonalization procedure? Explain.                        | 6M |
|   | b | Draw the block diagram of the structure and behaviour of Matched filter Receiver. | 4M |

**UNIT-IV**

- |   |   |  |    |
|---|---|--|----|
| 8 | a | Discuss in brief about coherent detection of binary FSK.   | 6M |
|   | b | Define DPSK. Determine the encoded and decoded output of a binary data stream 101101100 is to be transmitted using DPSK. | 4M |

**OR**

- |   |   |  |    |
|---|---|--|----|
| 9 | a | With the help of a block diagram of explain the operation of ASK transmitter and receiver. | 5M |
|   | b | Obtain the expression for probability of error for BPSK.                                   | 5M |

**UNIT-V**

- 10 a What is forward error correction system and explain with an example? **5M**
  - b Explain the concept of Parity check matrix for linear block codes. **5M**
- OR**
- 11 a What are the types of parity check codes explain with neat diagrams? **5M**
  - b Discuss in brief about sequential decoding of convolutional codes. **5M**

\*\*\*END\*\*\*

**UNIT III**

- 1. a Discuss in detail about binary code and its effect.
- b Derive the expression for the binary code for detecting the binary code.

OR

- 2. a Derive the expression for binary code of a marked filter.
- b Give a brief explanation on marked filter binary code.

**UNIT III**

- 3. a Explain the concept of binary code.
- b Explain the concept of binary code.

OR

- 4. a What is binary code and its effect?
- b Draw the block diagram of the binary code and its effect.

**UNIT IV**

- 5. a Discuss in detail about binary code and its effect.
- b Derive the expression for the binary code for detecting the binary code.

OR

- 6. a With the help of a block diagram explain the operation of binary code.
- b Derive the expression for binary code.