Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **14EC2021** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DIGITAL COMMUNICATION** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | With a neat block diagram explain the one bit modulator and discuss the types of quantization errors occurring in it. Also brief the methods to overcome the shortcomings. | CO1 | 15 |
| b. | State sampling theorem. Obtain the Nyquist rate for the given signal x(t) = cos (200πt)+ sin(400πt)+ cos(500πt). | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Sketch the block diagram of Pulse Code Modulation system and explain the function of each building blocks in detail. | CO1 | 15 |
| b. | What is quantization? Explain the types of quantization with necessary diagrams. | CO1 | 5 |
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| 3. |  | Obtain the optimum impulse response of the matched filter. Derive the condition for which the pulse signal to noise ratio is maximized also find the probability of error. | CO2 | 20 |
| (OR) | | | | |
| 4. | a. | Illustrate the DPSK waveform for the input d(t) = 0010011001111 also. sketch the transmitter and receiver diagram. | CO2 | 10 |
| b. | What is ISI? State the causes of ISI. With suitable block diagram and wave forms obtain the Nyquist’s criterion for distortion less baseband binary transmission. | CO2 | 10 |
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| 5. |  | Explain the principle and operation of Quadrature phase shift keying modulation transmitter and receiver with the help of block diagram and signal space diagram. | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Sketch the block diagram of MSK system and explain its principle and operation with signal constellation diagram. | CO2 | 20 |
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| 7. |  | Consider a (6,3) linear block code whose generator matrix is  1 0 0 :1 1 1  G = 0 1 0 :1 1 0  0 0 1 :1 0 1   1. Find all the code vectors and hamming weights. 2. Determine the error correcting and detecting capability. 3. Find the parity check matrix H. 4. Construct the decoding table. | CO3 | 20 |
| (OR) | | | | |
| 8. |  | Design a Convolutional encoder of code rate r=1/2 and constraint length of K=3 for the given generator polynomial (i) input-top adder output path is 111 (ii) input-top adder output path is 101.  a) Encode the message sequence 10011.  b) Draw the code trellis and state diagram for encoding. | CO3 | 20 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Sketch the block diagram of DS-spread spectrum system transmitter and receiver and explain the function performed by each block in detail. | CO3 | 10 |
| b. | Define frequency hopping? Illustrate with suitable diagrams, how the PN sequence is used in fast frequency hopping spread spectrum. | CO3 | 10 |