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

**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May – 2017**

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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. |  | With a neat block diagram enlighten the one bit modulator and discuss the types of quantization errors occurring in it. Also brief the methods to overcome the shortcomings. | CO1 | 20 |
| (OR) | | | | |
| 2. | a. | State your perception about sampling? With necessary waveforms clarify Impulse sampling and Natural sampling. | CO1 | 15 |
| b. | Write a short note on Adaptive delta modulation. | CO1 | 5 |
| 3. |  | Obtain the optimum impulse response of the matched filter. Derive the condition for which the pulse signal to noise ratio is maximized. | CO1 | 20 |
| (OR) | | | | |
| 4. |  | State your perception about ISI? State the causes of ISI. With suitable block diagram and wave forms obtain the Nyquist’s criterion for distortionless baseband binary transmission and ideal solution. | CO1 | 20 |
| 5. | a. | Explicate the principle and operation of BPSK transmitter and receiver with the help of block diagram and signal space diagram. | CO2 | 15 |
|  | b. | Discuss about M ary FSK. | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | Draw the block diagram for the generation and detection of QASK signal. | CO2 | 15 |
|  | b. | Sketch the block diagram for the baseband transmission model | CO2 | 5 |
| 7. | a. | 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 tree and state diagram for encoding. | CO3 | 15 |
|  | b. | Consider the four codes listed below: symbol: s0,s1,s2,s3,s4  Code I: 0, 10,110,1110,1111. Code II: 0,01,001,0010,0011. Code III: 0,01,011,110,111. Code IV: 00,01,10,110,111. Two of these four codes are prefix codes. Identify them and construct their individual decision trees. | CO3 | 5 |
| (OR) | | | | |
| 8. |  | A discrete memoryless source has an alphabet of five symbols with their probabilities for its output as given here:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Symbol | s0 | s1 | s2 | s3 | s4 | | Probability | 0.4 | 0.2 | 0.2 | 0.1 | 0.1 |   Compute two different Huffman codes for this source. Hence, for each of the two codes, find  (a) The average code-word length  (b) The variance of the average code-word length over the ensemble of source symbols. | CO3 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Draw the block diagram of frequency hop spread spectrum system and explain slow frequency hop technique with one example. | CO3 | 15 |
|  | b. | Discuss about PN sequence generation. | CO3 | 5 |