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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **14EC2045** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SPREAD SPECTRUM SYSTEMS** | **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. | Construct frequency hopped spread spectrum (FHSS) system and with the neat sketch, explain each of the operational block. | CO1 | 08 |
| b. | Analyze the direct sequence spread spectrum (DSSS) and conclude its merits and demerits over FHSS. | CO1 | 08 |
| c. | Compare frequency hopping spread spectrum with direct sequence spread spectrum. | CO1 | 04 |
| **(OR)** | | | | |
| 2. | a. | Compare the working of Linear with Non-Linear Equalizer in detail. | CO1 | 16 |
| b. | Develop the equation for Inter symbol interference (ISI). | CO1 | 04 |
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| 3. | a. | Discuss the operation of extremely practical MSK DSSS transmitter and receivers and draw the phase transitions at various points. | CO1 | 16 |
| b. | Explain balanced QPSK modulation. | CO1 | 04 |
| **(OR)** | | | | |
| 4. | a. | Examine Coherent Frequency Hopped Spread Spectrum system and with the neat sketch, explain the operational block. | CO3 | 16 |
| b. | Compare the DSSS with FHSS in terms of processing gain and electromagnetic compatibility. | CO3 | 04 |
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| 5. | a. | Develop all possible output of the maximal length sequence feedback-shift-register configuration shown below with initial condition [1 0 0 0 0]. Also verify the balance and runs properties. | C02 | 16 |
| b. | Identify the properties of maximal-length-sequence. | CO2 | 04 |
| **(OR)** | | | | |
| 6. | a. | Find the composite signal or the sum signal (***S***) of the following given channel. Also find the periodic correlation between ***c*** and ***s*** for all the user and prove that the transmitted data is correctly decoded at the three user’s receiver end. There are three simultaneous user pair and they are transmitting +1, +1 and -1 respectively in the same channel. For the three users, assign the PN sequences ***c***(1), ***c***(2) and ***c***(3). ***c***(1) is the basic PN sequence of length seven. ***c***(2) and ***c***(3) are its first and third right cyclic shifts. | CO2 | 14 |
| b. | Discuss the uniform and non-uniform search strategy with neat diagram of a serial-search acquisition system. | CO2 | 06 |
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| 7. | a. | Categorize the code tracking loops (coarse synchronization) for spread spectrum systems. Describe the loops which accomplish the correlation operation using a single channel and two independent channels. | CO3 | 16 |
| b. | List the advantages of TDL over DLL. | CO3 | 02 |
| c. | Distinguish coherent from noncoherent DLL. | CO3 | 02 |
| **(OR)** | | | | |
| 8. | a. | Build the baseband noncoherent Delay-Lock tracking Loop for coarse synchronization, draw the dc outputs of delay discriminator for various values of τd /Tc (0.25,0.45,0.75 and 1.00) and conclude based on your observation. | CO3 | 16 |
| b. | Explain the concept of coherent Delay-Lock tracking Loop system. | CO3 | 04 |
|  | | **Compulsory**: |  |  |
| 9. |  | Explain the acquisition and synchronization strategies and compare them in terms of complexity and acquisition time. | CO1 | 20 |