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

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

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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. | Can multiple direct sequence spread spectrum systems co-exist in the same band? Examine with an illustration. | CO1 | 14 |
| b. | Compare frequency hopping spread spectrum and direct sequence spread spectrum. | CO1 | 3 |
| c. | List out the methods to improve receiver signal quality. | CO1 | 3 |
| (OR) | | | | |
| 2. | a. | Discuss in detail about the Linear and Non-Linear Equalizer. | CO1 | 14 |
| b. | Find and draw the spreading and de-spreading waveforms for the data [1, 0] with   1. spreading code [ 0 1 1 0 0 1] of processing gain 3. 2. spreading code [ 0 1 1 0 1 0 0 1] of processing gain 4. | CO1 | 6 |
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| 3. | a. | Explain the working of BPSK DSSS system with mathematical model. | CO1 | 10 |
| b. | Deconstruct single and dual channel QPSK DSSS receivers and desirable each operational block. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Construct Coherent Frequency Hopped Spread Spectrum system with the neat sketch and clarify the operational blocks. | CO3 | 10 |
| b. | With neat block diagram describe the hybrid DS/FH spread spectrum transmitter. | CO3 | 10 |
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| 5. | a. | With an example illustrate the characteristics, strength and weaknesses of PN sequences. | CO2 | 10 |
| b. | Consider the maximal length sequence feedback-shift-register configuration shown below. Determine, all possible output of the circuit with initial condition [1 0 0 0 0]. Also verify the balance and runs properties. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Analyze the Gold codes with improved correlation property designed from the preferred pair of m-sequences. | CO2 | 10 |
| b. | With neat diagram of a serial-search acquisition system, enlighten the uniform and non-uniform search strategy. | CO2 | 10 |
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| 7. | a. | Propose the baseband coherent Delay-Lock tracking Loops with linear and nonlinear equivalent circuits. | CO3 | 10 |
| b. | Assess the concept of optimum tracking loop for arbitrary wideband signal. | CO3 | 10 |
| (OR) | | | | |
| 8. | 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. | CO1 | 15 |
| b. | Discriminate between the phase discriminators used for carrier tracking and code tracking(coarse synchronization). | CO1 | 5 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the four acquisition strategies and compare them in terms of complexity and acquisition time. | CO3 | 15 |
| b. | Summarize two major design approaches for initial code acquisition | CO3 | 5 |