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

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

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| **Code :** | **18EC3010** | **Duration :** | **3hrs** |
| **Sub. Name:** | **GLOBAL POSITIONING SYSTEM** | **Max. marks:** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Derive the expression for user position and velocity calculations with no errors constraint using earth-centered and earth-fixed (ECEF) coordinate system. | CO1 | 10 |
| b. | Appraise the different notations to refer to the GPS satellites in their orbits and draw the planar projection of GPS constellation. | CO1 | 6 |
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| 2. | a. | Describe the phases in space segment development of GPS satellite system. | CO1 | 10 |
| b. | Construct the 4X4 covariance matrix of dilution of precision (DOP) and list out the important elements of DOP. | CO1 | 6 |
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| 3. | a. | With neat block diagram describe the user segment of GPS satellite system and conclude its design parameters. | CO1 | 10 |
| b. | Describe the configurations and functions of major elements in control segment of GPS. | CO1 | 6 |
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| 4. | a. | Account for the complexity of the GPS signal. Describe the purposes and properties of the important signal components. | CO2 | 12 |
| b. | Substitute L2 signals' quadrature-phase components in the structure of L1. And with the help of timing diagram explain the generation of L2 band signals. Do bring out the relationship between the mathematical models of L1 and L2 band signals. | CO2 | 4 |
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| 5. | a. | Break down the GPS receiver design steps into four segments and specify their functionality. Also summarize the purpose of frequency down conversion. | CO2 | 12 |
| b. | Evaluate the noise power for the full GPS signal bandwidth of 20MHz in high-end receiver unit. Assume the dominant type of noise in the RF amplifier stage as thermal noise. | CO2 | 4 |
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| 6. | a. | The extraction of information for navigational solution can be classified into three categories. But recognize the generic procedure of these three categories for extracting information from the signal components. | CO2 | 10 |
| b. | Sketch out the navigation message frame structure and compile the information contained in the 50-bps data stream of GPS navigation message frame. | CO2 | 6 |
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| 7. |  | With neat block diagram describe the generic GPS receiver architecture. | CO3 | 16 |
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| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8 | a. | Retell in your words about the applications of GPS in surveying and mapping. | CO3 | 10 |
| b. | Sketch out the real time applications of GPS in air navigation. | CO3 | 10 |