MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
*(A constituent institution of MAHE, Manipal)*

**SEMESTER-I, M. TECH (DEFENCE TECHNOLOGY)**
**END-SEMESTER EXAMINATION, FEB./MARCH, 2022**
**COURSE: Autonomy and Navigation Technology (ECE 5029)**

**Duration: 3 Hrs** **Date: 02/03/2022** **MAX. MARKS: 50**

***Note:***

- *All questions are compulsory*
- *Draw a neat diagram wherever necessary*
- *Stepwise answers carry marks*

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| **Q1a.** | Explain with reasons why sophisticated navigation systems have become so important in modern times. | **[2M]** |
| **Q1b.** | Explain the various applications and phases of navigation. | **[3M]** |
| **Q1c.** | Explain Dead reckoning with its computation. | **[5M]** |
| **Q2a.** | What is "cocked hat" in LORAN system? | **[2M]** |
| **Q2b.** | Describe the working of differential GPS. | **[3M]** |
| **Q2c.** | Describe Proportional Navigation (PN) Guidance Law with detailed diagram. | **[5M]** |
| **Q3a.** | Explain the various components of satellite signal in detail. | **[5M]** |
| **Q3b.** | Describe mathematically LOS guidance. | **[5M]** |
| **Q4a.** | Compare GPS vs GLONASS and explain what are the advantages of GLONASS over GPS. | **[5M]** |
| **Q4b.** | What is Pursuit Guidance Law? Explain its types. | **[5M]** |
| **Q5a.** | What is synchronization error in a GLONASS satellite? Design a methodology to reduce this problem. | **[2M]** |
| **Q5b.** | Describe all the GNSS observable errors with examples. | **[3M]** |
| **Q5c.** | Describe the architecture of a semantic SLAM with a realistic example. | **[5M]** |