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



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

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| **Code :** | **14AE2027** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NAVIGATION, GUIDANCE AND CONTROL OF AEROSPACE VEHICLES** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Recall your knowledge on the following.   1. DR navigation 2. Automatic Direction Finder & NDB 3. Distance Measurement Equipment | CO1 | 6  7  7 |
| **(OR)** | | | | |
| 2. |  | Explain the first approach guidance systems developed in 1966 in California. | CO1 | 20 |
|  |  |  |  |  |
| 3. | a. | An aircraft cruising at 150 kmph on autopilot mode is given a reference pitch angle of 20 degrees. The autopilot control system has a transfer function as follows. Determine the stability of the system with a neat sketch of rootlocus.  G(s) = | CO2 | 15 |
| b. | Explain longitudinal autopilot. | CO2 | 5 |
| **(OR)** | | | | |
| 4. |  | Using the row of zeros and first element zero methods, solve the following.   1. The characteristic polynomial of a system of a system is   s7 + 9 s6 + 24 s5 + 24 s4 + 24 s3 + 24 s2 + 23s + 15 = 0. Determine the location of roots on s-plane and hence the stability of the system.   1. Characteristic equation is s5 + s4 + 2s3 + 2s2 + 3s + 5 = 0 | CO1 | 10  10 |
|  |  |  |  |  |
| 5. |  | Simplify the following block diagram and obtain the transfer function of the system. | CO2 | 20 |
| **(OR)** | | | | |
| 6. |  | Simplify the following signal flow graph and obtain the transfer function of the system. | CO2 | 20 |
|  |  |  |  |  |
| 7. |  | Sketch the bode plot for the following transfer function and determine phase margin and gain margin s2  G(s) = | CO2 | 20 |
| **(OR)** | | | | |
| 8. |  | The open loop transfer function of a unity feedback system is given by G(s)=1/s2(1+s)(1+2s). Sketch the polar plot and determine the gain margin and phase margin. | CO2 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | Explain different radar missile guidance systems. | CO2 | 20 |