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18AE/AS743

Seventh Semester B.E. Degree Examination, Feb./Mar.2022 Guidance, Navigation and Control

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the basic principle of guidance, navigation and control with a block diagram. (10 Marks)
b. Write short notes on Air Data Information for navigation. (10 Marks)

OR

- 2 a. Illustrate the working principle of radar. Briefly explain any 3 different types of Radar. (12 Marks)
b. Differentiate MTI and Pulse Doppler Radar. (08 Marks)

Module-2

- 3 a. Explain the working of sequential lobbing with its advantages and disadvantages. (10 Marks)
b. Write short notes on:
(i) Automatic detection and track. (ii) Single target track.
(iii) Phased array radar. (iv) Track while scan.
(v) Angle tracking. (10 Marks)

OR

- 4 a. Explain in detail about Inertial Navigation system and its components. (10 Marks)
b. Explain the working of GPS in detail with its limitations. (10 Marks)

Module-3

- 5 a. Differentiate open loop and closed loop control system. (08 Marks)
b. Determine the stability of the system given by the characteristics equation below:
(i) $\lambda^3 + 6\lambda^2 + 12\lambda + 8 = 0$
(ii) $\lambda^5 + \lambda^4 + 3\lambda^3 + 3\lambda^2 + 4\lambda + 6 = 0$ (12 Marks)

OR

- 6 a. Explain the control of aerodynamic missile. (08 Marks)
b. Describe the principle of roll stabilization system with the help of a block diagram. (12 Marks)

Module-4

- 7 a. Explain in detail about the command guidance system in a missile. (10 Marks)
b. Explain about Bank to Turn missile guidance system. (10 Marks)

OR

- 8 a. Explain in detail about the proportional navigation guidance. (12 Marks)
b. Compare the proportional and command guidance performance. (08 Marks)

Module-5

- 9 a. Explain Director fire control system with a block diagram. (10 Marks)
b. Explain the significance of tracking control laws. (10 Marks)

OR

- 10 Write short notes on the following :
(i) Longitudinal flight control system.
(ii) Lateral flight control system. (20 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.