

CBCS SCHEME

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15AE754

Seventh Semester B.E. Degree Examination, Aug./Sept,2020 Guidance, Navigation and Control

Time: 3 hrs.

Max. Marks: 80

- Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data suitably.

Module-1

- 1 a. Define the terms:
(i) Navigation (ii) Guidance (iii) Control
Explain the concept of each. (04 Marks)
- b. Explain the basic principle of RADAR with a neat sketch. Derive RADAR Range equation. (12 Marks)

OR

- 2 a. Positions of two aircrafts A and B are as shown in Fig.Q2(a). Aircraft A has a speed of 800 m/s and carries a CW transmitting RADAR transmitting at 400 MHz frequency and tracking aircraft 'B' which has a speed of 1000 m/s. Calculate
(i) The Doppler frequency shift recorded by the Radar in Aircraft 'A'
(ii) Is the shift positive (or) negative

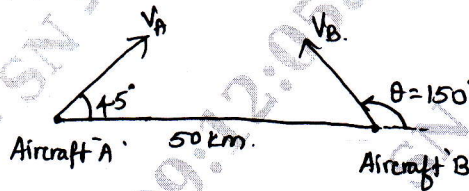


Fig.Q2(a)

- b. Explain the operation of MTI RADAR with a neat block diagram. List out the various types of it and mention its limitations on performance. (12 Marks)

Module-2

- 3 a. Define Tracking with respect to RADARS. List out the different parameters of Tracking. (04 Marks)
- b. Illustrate the principle of conical scanning and sequential lobing with a neat sketch. (08 Marks)
- c. Write a short note on Automatic Tracking using Surveillance RADARS (ADT). (04 Marks)

OR

- 4 a. Write a short note on the following Guidance Systems:
(i) Inertial Guidance. (ii) Laser Based Guidance (08 Marks)
- b. Explain the operation of Global Positioning System (GPS). Mention its advantages. (08 Marks)

Module-3

- 5 a. Define Transfer function. Obtain the Generalized Transfer function of Open loop and Closed loop system. (08 Marks)
- b. Differentiate Open loop and Closed loop system. (08 Marks)

OR

- 6 a. Explain the Roll Stabilization System with a neat diagram. (08 Marks)
b. Explain the function of Missile Autopilot with a neat diagram. (08 Marks)

Module-4

- 7 a. Define the terms with respect to Missile Guidance:
(i) Lateral Acceleration (ii) Miss-Distance
(iii) Closing velocity (iv) Blind zone (04 Marks)
b. Explain the following :
(i) Command Guidance (12 Marks)
(ii) Homing Guidance and its types

OR

- 8 Write a short note on :
(i) Proportional Navigation Guidance (16 Marks)
(ii) Bank to turn Guidance

Module-5

- 9 a. Briefly explain the function of Director Fire Control System with a neat diagram. (10 Marks)
b. Discuss the role of Tracking Control Laws (TCL) in System Integration. (06 Marks)

OR

- 10 Explain Longitudinal Flight Control System (POCS) and Lateral Flight Control System in detail. (16 Marks)
