

CBCS SCHEME

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18AE/AS753

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024

Unmanned Aerial Vehicles

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Write short notes on Aviation history in the invention of UAV. (10 Marks)
b. Describe generic UAV system with neat sketch. (10 Marks)

OR

- 2 Explain about very small UAV, small UAV, medium UAV and large UAV with its dimensions and sketch. (20 Marks)

Module-2

- 3 a. Define boundary layer and discuss the effects of boundary layer on the performance of UAV. (10 Marks)
b. Draw and explain about : i) Aircraft polar ii) Induced Drag. (10 Marks)

OR

- 4 a. Derive the equation for range and Endurance for Jet propelled aircraft. (10 Marks)
b. Obtain the relation for rate of climb equation with force diagram. (10 Marks)

Module-3

- 5 a. Write short notes about the following : i) Positive and Negative Stability
ii) Roll Stability and Directional Stability. (10 Marks)
b. Explain about : i) Aerodynamic control ii) Pitch control. (10 Marks)

OR

- 6 a. Explain block diagram of a closed-loop automatic control system with sketch. (10 Marks)
b. Explain about the following with sketch :
i) Flight control system block diagram ii) Flight control classification. (10 Marks)

Module-4

- 7 a. Derive the expression for Lift to power ratio and explain (10 Marks)
b. Discuss about sources of Electric power. (10 Marks)

OR

- 8 a. Discuss about materials used in construction of UAV and different methods of construction. (10 Marks)
b. Discuss the dynamic with Maneuver load diagram and Gust diagram. (10 Marks)

Module-5

- 9 a. Draw and explain about MPCS with its block diagram. (10 Marks)
b. Discuss about methods of piloting the air vehicle and its limitations. (10 Marks)

OR

- 10 a. Explain about controlling pay loads and discuss about few generic payload classes. (12 Marks)
b. Discuss the design issues related to carriage and delivery of weapons in UAV. (08 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.