CBCS SCHEME

USN | | | | | | | | | | |

18AE753

Seventh Semester B.E. Degree Examination, June/July 2023
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. Briefly explain any four UAV's developed in India with technical specification. **(10 Marks)**

b. Define the terminologies :
(i) Range
(ii) Endurance
(iii) Pay load
(iv) Reconnaissance
(v) Surveillance. **(10 Marks)**

OR

2 a. Write a short note on Aviation History. **(06 Marks)**

b. Explain different missions of UAV. **(04 Marks)**

c. Describe classes of UAV system. **(10 Marks)**

Module-2

3 a. Derive the range equation for propeller driven and jet driven aircraft. **(08 Marks)**

b. Explain climbing and guiding flight. **(06 Marks)**

c. Derive the endurance equation for a propeller driven aircraft. **(06 Marks)**

OR

4 a. Discuss on the flipping wing mechanism with a neat sketch. **(10 Marks)**

b. Discuss the boundary layer concept. How it effects the performance of UAV? **(06 Marks)**

c. Define : (i) Induced drag (ii) Up wash Down wash **(04 Marks)**

Module-3

5 a. Draw a block diagram of flight control system and explain the components of autopilot systems of an UAV. **(10 Marks)**

b. Explain the sensors supporting Autopilot system of a UAV. **(10 Marks)**

OR

6 a. How a make an aircraft longitudinally stable when it experience a gust? Explain with supporting graph. **(12 Marks)**

b. With a neat sketch, explain the static stability and dynamic stability. **(08 Marks)**

Module-4

7 a. Explain the maneuver load on the flight with the help of v-n diagram. **(08 Marks)**

b. Explain the composite structures using UAV and explain their manufacturing techniques. **(08 Marks)**

c. Briefly explain Sandwich construction techniques. **(04 Marks)**

OR

8 a. Write a short note on the following :
(i) The two cycle engine.
(ii) The Rotary engine.
(iii) The gas turbine
(iv) Electric motors. **(08 Marks)**

b. What are the sources of Electric power in UAV? **(04 Marks)**

c. Using momentum generator concepts prove that the power required producing a given amount of lift is inversely proportional to the square of the wing span (or) propeller diameter. **(08 Marks)**

Module-5

9 a. What are the different modes of controlling payloads and Air Vehicles? Explain. **(10 Marks)**

b. Explain the UAV launch method and recovery systems for fixed wing vehicles. **(10 Marks)**

OR

10 a. Discuss on the Data rate Restrictions. **(10 Marks)**

b. Explain the functions of Data Link and desirable data link attributes. **(10 Marks)**

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