CBCS SCHEME

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

17AE82

Eighth Semester B.E. Degree Examination, July/August 2021
Flight Vehicle Design

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

1 a. Explain conceptual design process with flow chart. **(10 Marks)**
b. Define thrust loading. Write the equation for using loading effect on take-off and landing. **(10 Marks)**

2 a. Explain the aircraft mission requirements. **(10 Marks)**
b. Describe the preliminary estimate of take-off weight for an aircraft. **(10 Marks)**

3 a. What is lofting? Discuss the fuselage conic lofting configuration. **(10 Marks)**
b. Draw a typical V-N diagram for an aircraft and explain the important curves. Also draw the gust envelope of the typical aircraft. **(10 Marks)**

4 a. With neat sketch and equations explain the concept of using layout and loft. **(10 Marks)**
b. Explain the concept of Horizontal and Vertical tail design. **(10 Marks)**

5 a. Discuss the take-off analysis with neat sketch. **(10 Marks)**
b. With neat sketch and equation explain the achieve lift enhancement. **(10 Marks)**

6 a. Explain the Turbojet engine sizing. **(10 Marks)**
b. Describe the steps of propeller design for cruise. **(10 Marks)**

7 a. Write the pitching moment equation for trim condition of longitudinal static stability. **(10 Marks)**
b. Discuss lateral directional stability of aircraft with momentum equations. **(10 Marks)**

8 a. Describe the handling qualities of an aircraft Cooper-Harper rating scale. **(10 Marks)**
b. Write a short note on environmental constraints of general aviation. **(10 Marks)**

9 a. Explain landing gear arrangement with any one of the subsystem sizing. **(10 Marks)**
b. Write a short note on material selection for a typical aircraft. **(10 Marks)**

10 a. Explain the Air pressurization and air conditioning system. **(10 Marks)**
b. Describe the electric power system and avionics system for an aircraft. **(10 Marks)**

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