CBCS SCHEME

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17AE82

Eighth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Flight Vehicle Design

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 estimation of request amount of fuel to complete a mission of typical general aviation transport aircraft. **(10 Marks)**

b. Explain the influence of using leading on take-off and landing distance. **(10 Marks)**

OR

2 a. Define and explain why T/W and W/S are the important parameters to the considered during the initial design phase process. **(10 Marks)**

b. Explain the effect of wing loading on catapult take-off and minimum ceiling. **(10 Marks)**

Module-2

3 a. Explain the initial sizing of empennage for an commercial aircraft. **(10 Marks)**

b. Explain the flight envelope of aircraft limit load factor as a function of airspeed for gust loads. **(10 Marks)**

OR

4 a. Explain the method of wing lofting by interpolation airfoil co-ordinates based on constant present of chord and airfoil – coordinate with the same surface slopes. **(10 Marks)**

b. Explain the drag contribution through wetted area. **(10 Marks)**

Module-3

5 Explain the balance field length for the mission profile of subsonic aircraft. **(20 Marks)**

OR

6 Explain active and passive lift enhancements with different sketches and characteristics. **(20 Marks)**

Module-4

7 a. Derive the necessary equations for longitudinal pitch stability of the air-left with neat sketch. **(15 Marks)**

b. Explain static margin and downwash in aircraft. **(05 Marks)**

OR

8 a. Derive an equation for lateral stability with necessary sketch. **(15 Marks)**

b. Draw the cooper harper scale. **(05 Marks)**

Module-5

9 a. Explain briefly about the aircraft launching gear system with necessary sketch. **(15 Marks)**

b. Briefly explain about the aircraft material selection with neat sketch. **(05 Marks)**

OR

10 a. Describe the air conditioning system and its classification in aircraft with neat sketch. **(10 Marks)**

b. Explain the concept of fatigue and safety constraints for the aircraft design. **(10 Marks)**

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