CBCS SCHEME

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

18AE81

Eighth Semester B.E. Degree Examination, Jan./Feb. 2023
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 overview of the design process with the various phases of aircraft design. **(10 Marks)**

b. Describe the process of estimating the take off weight build up during the aircraft design. **(10 Marks)**

OR

2 a. Explain Power Loading and Horse power to weight and describe the process of statistical estimation of T/W. **(10 Marks)**

b. With the help of relevant expressions, explain Instantaneous turn and sustained turn. **(10 Marks)**

Module-2

3 a. With the help of relevant sketches and equations, describe geometry sizing of fuselage, wing and tail of an aircraft. **(10 Marks)**

b. List the various special considerations in configuration layout. Explain in detail. **(10 Marks)**

OR

4 a. Illustrate the various stages of wing design and fuselage design with sketches. **(10 Marks)**

b. Describe the possible variations in aft-tail arrangement with sketches. **(10 Marks)**

Module-3

5 a. Explain the major option available for engine selection with illustration of propulsion system limits. **(10 Marks)**

b. Describe the various methods involved in the process of enhancing lift. List the disadvantages. **(10 Marks)**

OR

6 a. Estimate landing analysis and explain all segments involved during landing with equation and sketches. **(10 Marks)**

b. Explain various design spread sheet obtained in the estimation of lift enhancement, takeoff and landing analysis. **(10 Marks)**

Module-4

7 a. Describe longitudinal static stability and explain the man contribution of pitching moment with a neat sketch. **(10 Marks)**

b. Briefly describe the method of Aileron, Elevator and Rudder sizing with relevant sketches and equation. **(10 Marks)**

OR

8 a. Describe lateral static stability and explain the main contribution of Yawing moment with a neat sketch. **(10 Marks)**

b. With the help of Cooper-Harper scale explain the various flying qualities of an aircraft. **(10 Marks)**

Module-5

9 a. Briefly describe the following subsystems of aircraft :

(i) Hydraulic system

(ii) Auxiliary/Emergency power **(10 Marks)**

b. With the help of relevant sketches, explain the operation of flight control systems. **(10 Marks)**

OR

10 a. Briefly describe the following subsystems of aircraft :

(i) Pneumatic system

(ii) Communication system. **(10 Marks)**

b. Describe landing gear arrangement and the subsystems involved in the design of landing gears. **(10 Marks)**

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