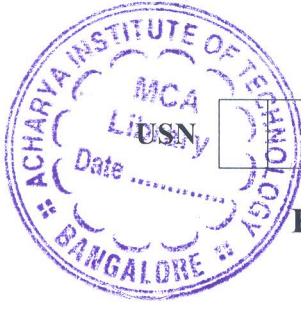


CBCS SCHEME



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)
