CBCS SCHEME

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17AE82

Eighth Semester B.E. Degree Examination, July/August 2022
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. Describe the overview of design process and explain the various phases of aircraft design. **(10 Marks)**

b. With the help of relevant sketches, explain the Take-off, Weight build up, Empty weight estimation and fuel fraction estimation of aircraft design. **(10 Marks)**

OR

2 a. Briefly describe the process of wing loading estimation of the following:
(i) Take off distance.
(ii) Landing distance. **(10 Marks)**

b. Describe statistical estimation of thrust to weight and explain thrust matching with suitable sketches. **(10 Marks)**

Module-2

3 a. Explain ionic Conic lofting . Describe the process of Conic lofting used in the development of an aircraft wing. **(10 Marks)**

b. With the help of suitable sketches, explain the design of weapon carriage in an aircraft design. **(10 Marks)**

OR

4 a. List the additional consideration in the design of military aircrafts. Describe in detail. **(10 Marks)**

b. Explain the process of passenger compartment in an aircraft layout with suitable sketches. **(10 Marks)**

Module-3

5 a. Describe the process of correction involved in the estimation of Installed engine thrust with equation. **(10 Marks)**

b. Explain the major options available for engine selection with illustration of propulsion system limits. **(10 Marks)**

OR

6 a. Estimate the distance required for landing of an aircraft and explain all the segments with equations. **(10 Marks)**

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

Module-4

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

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

OR

8 a. Describe lateral static stability and explain the main contribution of rolling and yawing moments with equation. **(10 Marks)**

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

Module-5

9 a. With the help of relevant sketch, explain the operation of flight control systems. **(10 Marks)**

b. Briefly explain propulsion and fuel system integration in an aircraft. **(10 Marks)**

OR

10 a. Describe landing gear arrangements and the subsystems involved in the design of landing gear. **(10 Marks)**

b. Briefly describe the following subsystems of an aircraft:

(i) Hydraulics system.

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

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