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10AE81

Eighth Semester B.E. Degree Examination, June/July 2018
Flight Vehicle Design

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.**PART – A**

- 1 a. Explain the overview of design process. (08 Marks)
 b. List out the performance aspects specified by mission requirements. (04 Marks)
 c. Calculate the near exact weight for an airplane form a guess value for the following data :

$$\frac{w_c}{w_0} = 0.93w_0^{-0.07} \quad w_0 = \frac{10,800}{1 - 0.314 - \left(\frac{w_c}{w_0}\right)} \quad (08 \text{ Marks})$$

- 2 a. Briefly explain the effect of using loading on Takeoff and landing plane with the help of appropriate graph. (12 Marks)
 b. Derive an expression for using loading effect on climb. (08 Marks)
- 3 a. Explain the using sweep angle selection criteria. (10 Marks)
 b. Mention and briefly explain the aerodynamic consideration mode while designing n aircraft fuselage. (10 Marks)
- 4 a. Explain the general methodology for designing a propeller propulsion system for cruise. (10 Marks)
 b. What are the engines installed thrust corrections? (10 Marks)

PART – B

- 5 a. Describe the balance field length for takeoff Also mention the formula used. (10 Marks)
 b. Enlist all phases of flight landing with schematic sketch and mention all the expressions related to each phase. (10 Marks)
- 6 a. Explain aileron sizing. (08 Marks)
 b. Explain longitudinal stability effect on performance of the aircraft. (12 Marks)
- 7 a. Sketch and explain three commonly used landing gear arrangement. (10 Marks)
 b. With neat sketch, explain fuel system of an aircraft. (10 Marks)
- 8 a. Explain typical flight control systems. (10 Marks)
 b. Briefly explain weapon carriage and gun installation on military aircraft. (10 Marks)

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