USN | | | | | | | | | | 18AE61

Sixth Semester B.E. Degree Examination, July/August 2022
Aircraft Performance

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. Explain basic parameters of flight in steady unaccelerated flight.   **(08 Marks)**
    b. With a graphical approach method, explain
       i) Thrust available and Thrust required
       ii) Power available and power required.   **(12 Marks)**

OR

2   a. Derive the equation which shows, V_α for a given T_R depend on T_R/W, W/s, C_{D_O} and K.   **(10 Marks)**
    b. Explain the effects of altitude on power available and power required.   **(10 Marks)**

Module-2

3   a. Define Gliding flight and Derive an expression for minimum glide angle.   **(10 Marks)**
    b. With neat sketch, illustrate absolute ceiling and service ceiling. Explain the method to calculate it.   **(10 Marks)**

OR

4   a. Explain the climb performance using Hodograph diagram.   **(10 Marks)**
    b. Derive Rate of climb using analytical approach and explain briefly.   **(10 Marks)**

Module-3

5   a. Obtain an expression for calculating the stalling velocity with help of $(C_{L\ max})$.   **(10 Marks)**
    b. Derive the Aerodynamic relations associated with maximum $\dfrac{C_L}{C_D}$, $\dfrac{C_L^{3/2}}{C_D}$ and $\dfrac{C_L^{1/2}}{C_D}$.   **(10 Marks)**

OR

6   a. Derive the Range and Endurance equation for a jet propelled aircraft.   **(14 Marks)**
    b. Write a short note on : i) Effect of Head wind   ii) Effect of Tail wind.   **(06 Marks)**

Module-4

7   Derive the equations to calculate the ground roll for accelerated flight for takeoff condition.   **(20 Marks)**

OR

8   a. For an accelerated flight, considering an aircraft landing, derive the equation to calculate the
    b. approach distance.   **(20 Marks)**

Module-5

9   a. Explain the following: i) Level Turn ii) Minimum Turn Radius   iii) Maximum Turn Rate.   **(10 Marks)**
    b. Explain the limiting case for large load factor, with necessary equation.   **(10 Marks)**

OR

10 a. With neat sketches, explain the pull up and pull out Maneuvers.   **(10 Marks)**
    b. Draw the V-n diagram and explain all the parameters in detail.   **(10 Marks)**

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