



INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

B.Tech IV Semester End Examinations (Regular), November – 2020

Regulation: IARE–R18

FLIGHT MECHANICS

(AE)

Time: 2 Hours

Max Marks: 70

Answer any Four Questions from Part A

Answer any Five Questions from Part B

PART – A

1. What is lapse rate? Find the value of lapse rate in troposphere. [5M]
2. Write about the trailing edge control surfaces and their application. [5M]
3. Describe about initial segments of take-off and landing of aircraft and at runway. [5M]
4. Explain about instantaneous pull-up of aircraft. [5M]
5. Illustrate with help of schematic for an alternate mission to determine the fuel reserves. [5M]
6. Describe about stall speed and minimum steady flight speed for an airplane. [5M]
7. How angle of attack is so important for assessing aircraft performance? [5M]
8. What is the importance of minimum fuel climb in flight performance of an airplane? [5M]

PART – B

9. How are typical variations of temperature and pressure in the earth's atmosphere. Explain with the help schematic diagram. [10M]
10. A standard altimeter indicates 15,000 ft when the ambient temperature is 35°F. Calculate the density altitude and the temperature altitude. [10M]
11. A fighter aircraft has a gross take-off weight of 30,000 lbs. In a test of one wing, the wing fails at a total loading of 243,000 lbs. What is the margin of safety? [10M]
12. What is the load factor? State the importance and explain in detail about V-N diagram with neat representation. [10M]
13. Describe the steady, level and coordinated turns with help of neat schematic diagram. [10M]
14. Explain about climb gradient and climb rate of an aircraft with thrust producing engines. [10M]
15. Draw a plot of power verses velocity and show the maximum excess power of climb for a propeller driven airplane. [10M]
16. Elaborate and describe cruise technique - 1 and explain the advantages and disadvantages. [10M]
17. Calculate the total landing distance for our Gulf stream - like airplane at standard sea level, assuming that (for conservatism) the landing weight is the same, as the take off gross weight of 73,000 lb. Assume that no thrust reversal is used and that the runway is dry concrete with a brakes-on value of $\mu_r = 0.4$. The approach angle is 3° . [10M]
18. How do you understand the landing process? Explain the different segments with schematic. [10M]