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Sixth Semester B.E. Degree Examination, June/July 2016
Aircraft Performance

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
 atleast TWO questions from each part.**

PART – A

- 1 a. Define the term 'standard atmosphere obtain the relation to calculate the pressure, density and temperature in the gradient and constant regions. (10 Marks)
- b. An airplane is flying at an altitude where the actual pressure and temperature are 4.72×10^4 N/m and 255.7 k respectively what are the pressure, temperature and density altitudes. (10 Marks)
- 2 a. Describe the concept of power available and power required of propeller driven aircraft. (10 Marks)
- b. Explain with force diagram : i) level flight ii) climb and descending. (10 Marks)
- 3 a. Derive equation of motion for rate of climb and explain graphic of approach. (10 Marks)
- b. The maximum lift drag ratio for the CP -1 is 13.6, calculate the minimum glide angle and the maximum range measured along the ground covered by the CP - 1 in a power of glide that starts at an altitude of 3048 m and also calculate the equilibrium glide velocity at altitude 3048 and 609.6 m each corresponds to min glide angle ($W = 2950$ N, $S = 174$ m²) and $C_L = 0.634$ $P_\infty = 0.905$ kg/m³). (10 Marks)
- 4 a. Describe aerodynamic relation for lift-to-drag ratio. (10 Marks)
- b. Explain briefly high-lift devices. (10 Marks)

PART – B

- 5 a. Derive the Breguet range expression for a propeller driven airplane. List the condition for obtaining maximum range. (10 Marks)
- b. Explain with plot the effect of head wind and tail wind on best range airspeed for a propeller driven airplane. (10 Marks)
- 6 a. Explain with neat sketch various phases of airplane undergoes during takeoff. (10 Marks)
- b. Derive expression for calculation of distance while airborne to clear an obstacle. (10 Marks)
- 7 a. Drive equation for calculating flare distance of airplane. (10 Marks)
- b. The maximum lift to drag ratio for the CP-1 is 13.6, $W = 2950$, $S = 174$ Calculate the minimum glide angle and maximum range measured along the ground, covered by CP-I in a power off glide that starts at altitudes of 3048 m and also calculate the equilibrium glide angle. (10 Marks)
- 8 a. Explain with neat sketch pull-up and pull-down maneuvers. (10 Marks)
- b. Describe the importance of V-n diagram on aircraft performance and write the limitations of pull-up and push-down. (10 Marks)

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