

Code No: 07A62101

R07

Set No. 1

III B.Tech II Semester Regular/Supplementary Examinations, May 2010
Flight Mechanics-II
Aeronautical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. What are the two necessary criteria for longitudinal balance and static stability? Explain with neat sketches. [16]
2. With the help of sketches, explain the method of measurement of coupled aerodynamic stability and damping derivatives in a wind tunnel. [16]
3. Prove using sketches and plots that the wing sweep back ($+\Lambda$) produces positive dihedral effect, i.e., (negative $C_{l\beta}$) [16]
4. Roll accompanies yaw and yaw accompanies roll - elaborate the statement with sketches. [16]
5. (a) Explain using an appropriate sketch, the relative positions of centre of gravity of an airplane and the stick fixed and stick free neutral points.
(b) Explain the requirement of c.g. limits of an aircraft for the two cases referred to above. [16]
6. Write the characteristic equations for a pure yawing motion. Explain the terms involved. [16]
7. Define and explain the stick - free maneuver point N'_m in terms of in terms of N'_0 and the derivatives $C_{H\alpha}$ and $C_{h,\delta}$. Explain all the terms involved. [16]
8. A rocket is flying at an airspeed of 300 m/s. The angle of attack is 30 degrees and the sideslip angle, β_e , is 20 degrees, with bank angle of 40 degrees and elevation angle of 20 degrees and an azimuth angle of 70 degrees. Assuming no wind, what is its velocity in earth - fixed coordinates? [16]
