Code: 9A21502

B.TECH III Year I Semester (R09) Supplementary Examinations, May 2012
**FLIGHT MECHANICS - I**
(Aeronautical Engineering)

Time: 3 hours                                                                 Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1     Describe skin friction drag of an air plane:
  (a)  The physics of its generation.
  (b)  How it may be estimated.
  (c)  Measures to reduce it.

2     Discuss with neat sketches, how an earth co-ordinate system or an inertial frame is transferred to body co-ordinate system. Use standard notations for different variables.

3 (a)  Classify with neat sketches, the different flight regimes, with reference to different Mach numbers.
  (b)  What are the flow conditions before and after an expansion wave? Draw neat sketches.

4 (a)  Name two aerodynamic characteristics of the wing that are affected by the aspect ratio of the wing and describe how.
  (b)  Discuss how each of these aerodynamic characteristics affect the performance characteristics of the airplane.

5     What is a trajectory? Explain different types of trajectories in detail.

6     Write a detailed note on take-off performance of an airplane, defining various terms involved, and bring out the differences in take-off and landing operations. Discuss various methods employed to shorten the landing ground run.

7     Explain:
  (a)  ROC (rate of climb) for accelerated flight.
  (b)  TOC (time of climb) for accelerated flight.

8     What is a sonic boom? Discuss its causes and how it can be avoided in a supersonic flight.

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