Code.No: 37160 | R05 | SET-2

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
IV.B.TECH - I SEMESTER REGULAR EXAMINATIONS NOV/DEC, 2009
HELICOPTER ENGINEERING
(AERONAUTICAL ENGINEERING)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1. a) Describe the different compounds of a single rotor helicopter. Draw neat sketches.
   b) Classify the helicopter based on torque reaction. [10+6]

2. a) Is a tail rotor essential for a helicopter? Explain.
   b) Explain feathering and 'lead-leg' with respect to a helicopter blade. [8+8]

3. a) Explain the aero dynamics when the blade of the helicopter rotor of the helicopter rotates in its own plane.
   b) What is the purpose of using 'equivalent' solidities in helicopter rotor performance? Explain in detail. [8+8]

4. a) Define the term 'figure of merit' of a helicopter rotor. Express it in terms of induced power and profile power.
   b) Define 'twist' of a rotor and do you call it ideal? Explain in detail? [8+8]

5. A large helicopter of 50 tones weight is to be designed with a rotor diameter of 40mm. The operating altitude is 4.5km. Rotor speed is restricted to 200 m\s. Assuming same blades, Calculate the chord of the rotor. Assume reasonable values for data not specified in the problem, but clearly state the assumptions. [16]

6. a) Discuss the directional stability of a helicopter.
   b) How does it differ from the directional stability of an airplane? [8+8]

7. Explain the following with neat sketch.
   a) Longitudinal control
   b) Lateral control
   c) Directional control
   d) Performance of VTOL airplane in lower [4 x 4]

8. Describe the aerodynamics and propulsion of lower craft using neat sketch. [16]

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