R09

Code No: 58092

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, May - 2017
HELICOPTER ENGINEERING
(Aeronautical Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
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1.a) Sketch the various configurations of helicopter and explain in detail .
b) Explain the features of the fully articulated rotor system, semi-rigid rotor system and rigid rotor system. [7+8]

2.a) Describe the effect of over-pitching while the a hover or during a hover.
b) State and explain the four basic main controls of a helicopter. [7+8]

3. Describe translating tendency, pendulum action, coning and ground effect during hovering flight of a helicopter. [15]

4. A Helicopter has an engine developing 600 kw and a rotor of 16m diameter with a disc loading of $170 N/m^2$ when ascending vertically with constant speed at low altitude. The product of lift and axial velocity of air through the rotor disc is 53% of the power available. Estimate the velocity of ascent. [15]

5.a) Why rotor blades are twisted about their longitudinal axis in a helicopter? Explain the differences between hovering and vertical flights.
b) Discuss in brief about the lift dissymmetry in helicopter flight. [7+8]

6.a) Derive the expressions for induced power coefficient and blade profile power coefficient.
b) Explain the conditions for static longitudinal stability and directional stability of helicopter. [7+8]

7.a) Describe the thrust vectoring in VTOL airplane. Make use of neat sketches.
b) What are the differences between hovering and vertical flight? Why the rotor blades are twisted about their longitudinal axis? [7+8]

8.a) Explain with the help of diagram about the basic elements of a hovercraft. What are its advantages and disadvantages?
b) State the applications of hovercraft. [9+6]

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