

R09

Code No: 58092

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, April - 2018

HELICOPTER ENGINEERING

(Aeronautical Engineering)

Time: 3 Hours

Max. Marks: 75

**Answer any Five Questions
All Questions Carry Equal Marks**

1. Briefly explain the following with neat sketches
 - a) Single - rotors.
 - b) Tandem rotors
 - c) Co-axial rotors. [15]
- 2.a) Explain how a helicopter is controlled by cyclic pitch change?
 - b) Derive the expression the equilibrium condition for hinge lead control. [7+8]
- 3.a) Discuss the hovering performance of the helicopter and its limitations.
 - b) Explain the different pitches for airscrew and list the assumptions for Froude momentum theory. [7+8]
- 4.a) Derive an expression for power coefficient of a hovering rotor for a constant chord, ideally twisted blade with uniform inflow.
 - b) Explain in detail about profile and induced power estimations with suitable examples and required data. [7+8]
- 5.a) Draw neatly total power velocity curve. Explain it along IGE and OGE effects.
 - b) Explain briefly about swash plate control system with neat diagram. [8+7]
- 6.a) Explain briefly static longitudinal stability and static directional stability.
 - b) What are the parameters that govern static directional stability of a helicopter? [7+8]
7. Write short notes on tilt-wing configuration helicopter and derive the equation for lift coefficient of a tilt-wing configuration. [15]
8. Explain briefly about the hovercraft system. Derive the minimum power expression for peripheral jet machines. [15]

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