

R09

Code No: 58092

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, May - 2019

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 the types of lifting rotors with neat sketches.
b) Explain how a helicopter is controlled by cyclic pitch change.

[7+8]
- 3.a) What are the assumptions involved in momentum theory for a helicopter in vertical climb.
b) Draw the velocity variation and pressure variation for the actuator disk model used in momentum theory for hover and write the actual losses involved in power estimation.

[7+8]
4. Write short notes on
 - a) Autorotation
 - b) Wind-mill brake state of rotor
 - c) Figure of merit .

[15]
- 5.a) Explain in detail about the power requirements for helicopter performance analysis in forward flight.
b) Draw neatly the vertical take-off profiles from a level-surface and pinnacles. Explain it.

[7+8]
6. Write short notes on
 - a) Damping with neat sketches
 - b) Dihedral effect
 - c) Directional stability

[15]
- 7.a) Explain briefly about STOL performance of a vectored-thrust turbofan engine with suitable example and neat sketches.
b) Write short notes on propeller engine.

[8+7]
- 8.a) Write about the effects of drag on the performance of hovercraft on water with suitable examples.
b) Write short notes on lift augmentation for plenum chamber and derive an expression for it.

[8+7]

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