

Code No: 58092

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July - 2021

HELICOPTER ENGINEERING

(Aeronautical Engineering)

Time: 3 hours

Max. Marks: 75

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

1. Classify single rotor and multi-rotor configurations? Illustrate the side-by-side rotor with diagrams. [15]
- 2.a) Explain feathering and 'lead-lag' with respect to a helicopter blade.
b) Discuss how a helicopter is controlled by cyclic pitch change with neat sketches. [7+8]
- 3.a) What are the assumptions involved in momentum theory for a helicopter in vertical climb?
b) Explain different pitches for air screw and list the assumptions for Froude momentum theory. [7+8]
- 4.a) Derive the expression for profile and induced powers.
b) What are the advantages of having an ideal twist? [8+7]
5. Demonstrate that part of the helicopter remains stalled in forward flight. Make use of sketches. [15]
6. Discuss the dynamic stability of a helicopter. How does it differ from the dynamic stability of an airplane? [15]
- 7.a) What are the principle details of a hovercraft? How does it obtain forward motion?
b) Write short notes on performance of VTOL aircraft in forward motion. [8+7]
- 8.a) Explain the working phenomena of hovercraft with sketches.
b) Derive the minimum power expression for peripheral jet machines. [7+8]

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