R09

Code No: 58092

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, July - 2019
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) Explain with a neat sketch the principle and functioning of Hinge less rotor helicopter
b) Describe the different parts of helicopter of single rotor configuration with neat sketch. [7+8]

2.a) Explain the types of lifting rotors with neat sketches.
b) Explain the differences between collective and cyclic pitch changes. [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.a) Explain the method of constant chord variation for blade airfoils.
b) A helicopter weighs 60,800 N has a single rotor of 17 m diameter. Estimate the power required to fly forward at a speed of 22 m/sec at sea level. Take C_d (based on rotor disc area) as 0.0056. [7+8]

5. Write a short note on the following power requirements in forward flight:
a) Induced
b) Profile and Parasite. [7+8]

6.a) What do you mean dynamic stability of a helicopter? Explain it in detail.
b) Define trim. And explain the concept of helicopter static stability. [8+7]

7.a) Write short notes on performance of VTOL aircraft in forward motion.
b) Illustrate the working mechanism of a tail sitter. And explain its salient features. [7+8]

8. Explain various types of ground effect machines with their constructional features, advantages and disadvantages. [15]

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