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Total No. of Questions: [09]

Total No. of Printed Pages: 1

B. Tech. (Aeronautical Engg.) (Semester –6th)
HELICOPTER ENGINEERING
Subject Code: BANES1602
Paper ID: [18110232]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

- Q1. Attempt the following:
- a. Define Tip Speed. How does it affect the helicopter performance during forward flight?
 - b. Explain the phenomenon of coriolis effect.
 - c. What is 'Ring guard' tail rotor system and how it is better than conventional tail rotor?
 - d. What is meant by the term flight performance take-offs' in helicopter?
 - e. Differentiate between feathering and flapping.
 - f. Why is it named as Retreating Blade? Justify.
 - g. What is the purpose of providing hinges in helicopter rotor blades?
 - h. Differentiate between Longitudinal control and Lateral control?
 - i. Which component in a helicopter control system transmits movement of the cyclic and collective to the rotating blades?
 - j. Define Figure of merit and its importance.

Section – B

(5 marks each)

- Q2. A helicopter having mass of 10000N has a rotor diameter of 10 m. The rotor rotates at 100 rpm and is hovering at sea level conditions. Find the disk loading, induced velocity and rotor thrust coefficient.
- Q3. Write a short note on 'Mangler and Squire method'.
- Q4. Develop the actuator disc theory for helicopter.
- Q5. Distinguish between active and passive vibration control systems. Explain the various passive vibration control systems with the help of sketches.
- Q6. Explain the effect of following on helicopter performance:
- (a) Number of blades
 - (b) Ground effects
 - (c) Induced velocity
 - (d) Induced power

Section – C

(10 marks each)

- Q7. Write notes on the following:
- (a) Stability characteristics and their importance,
 - (b) Auto-stabilization.
- Q8. How does a helicopter gain height? Explain the aero dynamics of rotor wings aircraft during climb.
- Q9. Discuss in detail controlling the cyclic pitch in helicopter with the aid of sketches.