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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ANE) (Sem.-6)
HELICOPTER ENGINEERING
Subject Code : ANE-324
M.Code : 60533

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**Q1 Explain the following terms :**

- (a) Teetering type rotor
- (b) Articulated rotor
- (c) Autorotation
- (d) NOTAR.
- (e) Synchropter
- (f) Dissymmetry of lift
- (g) Solidity
- (h) Precession.
- (i) Hinge-less rotor
- (j) Feathering motion



SECTION-B

- Q.2 Explain the salient features of an articulated main rotor with the help of neat labelled sketch.
- Q.3 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.
- Q.4 Explain '*actuator disk theory*' using relevant expressions.
- Q.5 A tilt rotor helicopter weighs 80000N. The rotor diameter is 12m. On the basis of momentum theory, estimate the power required for the rotorcraft to hover at sea level on standard day. Assume that the figure of merit is 0.7 and transmission losses amount to 5%.
- Q.6 Explain the '*vortex ring state*' with the help of a neat sketch.

SECTION-C

- Q.7 Explain the importance of vibration absorbers in helicopters. Distinguish between active and passive vibration absorbers. Explain active vibration control systems with the help of sketches. (2,3,5)
- Q.8 Explain the effect of following on helicopter performance : (2,3,2,3)
- (a) Number of blades
 - (b) Ground effects
 - (c) Induced velocity
 - (d) Induced power
- Q.9 Write notes on the following : (2×5)
- (a) Stability characteristics and their importance
 - (b) Auto-stabilization

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.