Roll No. | | | | | | | | | | | | |

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

1. Answer briefly :

a) List the advantages of 'tandem rotor helicopters' over 'side-by-side rotor helicopter'.

b) Define Tip Speed. How it affects the helicopter performance during forward flight?

c) Explain the functions of main gear box.

d) Define Bearing-Less Rotor. How pitch variation is achieved in bearing-less rotor?

e) Explain the phenomenon of blade stall during forward flight of helicopter.

f) Define disk-loading. List the advantages and disadvantages of having low-disk-loading.

g) Explain the phenomenon of coriolis effect.

h) Define Figure of merit and its importance.

i) What is 'Ring guard' tail rotor system and how it is better from conventional tail rotor?

j) List advantages of 'rotary-wing' aircraft over 'fixed-wing' aircraft.

SECTION-B

2. Explain physically the effect of 'sideslip disturbance on the helicopter.

3. A helicopter weighing 25000 N has a rotor diameter of 14 m. The rotor rotates at 100 rpm and is hovering at sea level conditions. Find the disk loading, induced velocity and rotor thrust coefficient.

4. Write a short note on 'Mangler and Squire method'.

5. A tilt rotor helicopter weighs 800000 N. The rotor diameter is 12 m. 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 0.75 and transmission losses amount to 7%.

6. Explain the various types of auto-rotative landings.

SECTION-C

7. Distinguish between active and passive vibration control systems. Explain the various passive vibration control systems with the help of sketches. (4,6)

8. What are the basic controls of a helicopter? Describe how pilot uses these controls to achieve various desired flight conditions? (3,7)

9. Explain the working states of rotor with the help of neat sketches. (10)

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.