

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2022****Subject Code:3170113****Date:14/06/2022****Subject Name:Helicopter Engineering****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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|------------|--|-----------|
| Q.1 | (a) Enlist the types of helicopter. | 03 |
| | (b) List out the way in which a helicopter and an airplane differ technically. | 04 |
| | (c) What is lateral Flapping? State the effect of Flapping. | 07 |
| Q.2 | (a) Define Solidity. | 03 |
| | (b) Explain in short power vs speed variation for a helicopter rotor. | 04 |
| | (c) Explain Transverse Flow effect and Ground Effect. | 07 |
| | OR | |
| | (c) State the features of semi rigid and rigid rotor system. | 07 |
| Q.3 | (a) State the effect of centre of pressure. | 03 |
| | (b) What is Coriolis force, Drag force and Lift force? | 04 |
| | (c) Explain flight performance during a retreating blade stall. Also state the causes of retreating blade stall. | 07 |
| | OR | |
| Q.3 | (a) Define Parasite power and Total power. | 03 |
| | (b) What is speed stability and angle of attack stability? | 04 |
| | (c) Explain Anti torque system failure. | 07 |
| Q.4 | (a) Define rotor thrust and rotor efficiency. | 03 |
| | (b) How does the compressibility effect the helicopter? | 04 |
| | (c) Explain Stability augmentation system. | 07 |
| | OR | |
| Q.4 | (a) When the helicopter is said to be trimmed? | 03 |
| | (b) What is tail rotor system and where it is mounted? | 04 |
| | (c) Explain Centrifugal clutch with figure. | 07 |
| Q.5 | (a) What are the main parts of helicopter rotor? | 03 |
| | (b) What are the parameters influencing the main rotor design? | 04 |
| | (c) Write the Weight and balance data needed to determine proper loading of a helicopter. | 07 |
| | OR | |
| Q.5 | (a) State the effects of wind and weight on performance of helicopter. | 03 |
| | (b) State the Effects of too far forward C.G. in helicopter. | 04 |
| | (c) Explain Epicycle or Planetary gear train with neat sketch. | 07 |
