Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3170113 Date:01-12-2023

Subject Name:Helicopter Engineering

Time:10:30 AM TO 01:00 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
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)	State the features of Fully Articulated rotor system.	**07**
Q.2	**(a)**	State the effect of centre of pressure change on the rotor blade.	**03**
	(b)	What are the main parts of helicopter rotor? Mention the function of each.	**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)**	What is Lateral Blade flapping?	**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 affect 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 the velocity distribution over a helicopter rotor in forward flight and hover.	**07**
Q.5	**(a)**	Define climb power and induced power.	**03**
	(b)	State the Effects of too far forward C.G. in helicopter.	**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)	What are the parameters influencing the main rotor design?	**04**
	(c)	Explain Epicycle or Planetary gear train with neat sketch.	**07**

****