Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2018

Subject Code: 2180102/2180108 Date: 07/05/2018

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.**

			MARKS
Q.1	**(a)**	Define disk solidity.	**03**
	(b)	Differentiate between feathering and flapping.	**04**
	(c)	Draw and explain function of primary components of conventional helicopter.	**07**
Q.2	**(a)**	Define disk loading.	**03**
	(b)	Differentiate between cyclic and collective pitch.	**04**
	(c)	Discuss various types of main rotor configurations of helicopters.	**07**
		OR	
	(c)	With diagram explain how blade tip velocity varies with forward flight.	**07**
Q.3	**(a)**	Define power loading.	**03**
	(b)	Discuss geometry of a main rotor.	**04**
	(c)	Discuss various amount of power required at different phases of flight.	**07**
		OR	
Q.3	**(a)**	What do you understand by rotor solidity?	**03**
	(b)	Discuss various airfoil sections used for main rotors.	**04**
	(c)	What are difference between power required while hovering and cruising?	**07**
Q.4	**(a)**	Why does twist provided on main rotor?	**03**
	(b)	How will you decide number of main rotor blades required?	**04**
	(c)	Discuss various types of main rotor blade plan form shape.	**07**
		OR	

Q.4	**(a)**	How will you determine tail rotor power requirement?	**03**
	(b)	Only draw airflow pattern while hovering in ground effect and hovering without ground effect.	**04**
	(c)	Give the reason why helicopter shows bank while cruising?	**07**
Q.5	**(a)**	How will you modify wing tip if found it touches transonic speed?	**03**
	(b)	Explain airflow across main rotor blade during cruise.	**04**
	(c)	Discuss thrust and power coefficient.	**07**

OR

Q.5	**(a)**	Define blade profile power.	**03**
	(b)	Discuss effects of disk loading on helicopter maneuverability.	**04**
	(c)	Discuss climb power and induce power.	**07**

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