Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 162001 **Date: 05/05/2017**

Subject Name: Design of Mechanisms - I

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.**

Q.1	**(a)**	Write a note on Preferred numbers.	**07**
	(b)	Derive the equation to raise the load in case of power screw.	**07**
Q.2	**(a)**	Mention the various steps for material selection.	**07**
	(b)	What is the condition of self-locking in power screw? Always the efficiency of square threaded screw is less than 50%, justify.	**07**
		OR	
	(b)	Explain the procedure to design a knuckle joint with all the design steps and its relevant sketches.	**07**
Q.3	**(a)**	Write down the steps to design a shaft using strength and rigidity criteria.	**07**
	(b)	What do you mean by bolts of uniform strength? How it can be achieved.	**07**
		OR	
Q.3	**(a)**	Explain the Rankine's theory for column design. Mention various steps involved while designing the push rod.	**07**
	(b)	Explain Euler's column theory with assumptions and limitations.	**07**
Q.4	**(a)**	Mention various applications of Hand lever and foot lever. Explain the design steps for any one of them.	**07**
	(b)	Explain the design procedure for crank lever. Mention all the steps and draw a rough sketch.	**07**
		OR	
Q.4	**(a)**	What is hoop stress? Mention the design procedure for thin cylinder.	**07**
Q.4	**(b)**	Mention the various design criteria to design a cotter in socket and spigot joint. Please derive the criteria for bending in detail.	**07**
Q.5	**(a)**	Enlist various theories of elastic failure. Describe any two of them.	**07**
	(b)	Write a note on helical spring design. Explain in brief the use of leaf springs.	**07**
		OR	
Q.5	**(a)**	Explain : elasticity, compressive stress, fatigue, creep, hardness, modulus of resilience, wear.	**07**
	(b)	Derive the equations to design a composite spring.	**07**

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