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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code:162001 **Date:19/05/2016**

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)**	Design a turnbuckle to connect the two tie rods. The pull in the tie rod is to be 50 KN. Take allowable tensile stress =75 N/mm^2 and shear stress = 30 N/mm^2.	**07**
	(b)	What is stress concentration? Suggest the remedies for reducing it by stating various cases.	**07**
Q.2	**(a)**	Briefly explain the steps of generalized procedure of design.	**07**
	(b)	Write a short note on Factor of Safety and preferred numbers.	**07**
		OR	
	(b)	Explain the design procedure to design a socket and spigot joint with all the design steps and its relevant sketches.	**07**
Q.3	**(a)**	The shaft running at 120 rpm transmit 350 KW Power. The working condition to be satisfy by the shaft are (i) The shear stress must not exceed 55 MPa (ii) The angle of twist must not be more than 2^0 on a length of 16d Calculate the diameter of shaft. Take G= 0.85x10^5 MPa	**07**
	(b)	An electric motor driven power screw moves a nut in horizontal plane against a force of 75KN. The screw has a single square thread of 6 mm pitch on a major diameter of 40 mm. The co efficient of friction at screw thread is 0.1. Calculate the torque required to raise the load.	**07**
		OR	
Q.3	**(a)**	What is slenderness ratio? What are end fixity coefficients? Explain various cases of it by stating the value of coefficient.	**07**
	(b)	Explain Euler's column theory with assumptions and limitations.	**07**
Q.4	**(a)**	Explain the effect of curvature of coil in context of springs. What is whal's correction factor?	**07**
	(b)	What is mechanical advantage? Explain it in context of various levers, with rough sketches.	**07**
		OR	
Q.4	**(a)**	Explain the design procedure for cranked lever. Mention all the design steps.	**07**
Q.4	**(b)**	Mention the various design criteria to design a pin for knuckle joint.	**07**
Q.5	**(a)**	Explain the bolts of uniform strength. State various methodologies to obtain the uniform strength.	**07**

	(b)	A propeller shaft experiences torque and axial thrust. The stresses induced are shear stress= 85 N/mm^2 and tensile strength= 125 N/mm^2. Determine the principal stresses and the maximum shear stress.	**07**

OR

Q.5	**(a)**	Mention the various failures during key design. Explain it with a simple case and sketches.	**07**
	(b)	Explain the use of composite springs and leaf springs.	**07**

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