Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: 131902 **Date: 23-12-2014**

Subject Name: Machine Design and Industrial Drafting

Time: 02.30 pm - 05.30 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)**	Explain functions and classification of shaft.	**07**
	(b)	Find the diameter of a solid shaft to transmit 30kw at 230rpm.The shear stress is 50MPa.If a hollow shaft is to be used in place of solid shaft ,find the inside and outside diameter when the ratio of inside to outside diameter is 6:8.	**07**
Q.2	**(a)**	Define riveted joints. Explain different types of riveted joint with neat sketch.	**07**
	(b)	A double riveted double cover butt joint is made of 12mm thick plates. The rivet diameter and pitch are 20mmand 65mm respectively. Find the efficiency of the joint if,σt=100MPa, σcr=120MPa,τ=75N/mm^2	**07**
		OR	
	(b)	A plate,60mm wide and 80mm thick. It is welded with another plate by means of single transverse and double parallel fillet welds. Find the length of each parallel fillets if allowable tensile and shear stress in the weld material are 80 and60Mpa respectively.	**07**
Q.3	**(a)**	Explain procedure to design cotter joint.	**07**
	(b)	Two rods of 50mm diameter are to be joined by a cottered joint ,with thickness of cotter as 12.5mm. If the joint is withstand an axial pull of 6000KN find the various dimensions required. The permissible stresses are 300N/mm^2 in tension,200N/mm^2 in shear and450N/mm^2 crushing.	**07**
		OR	
Q.3	**(a)**	What are the different types of sunk key? Explain each with application.	**07**
	(b)	Design a protective type C.I.flange coupling for a steel shaft transmitting 15KW at 200rpm and having an allowable shear stress of 40N/mm^2 The working stress in the bolts should not exceed 30N/mm^2. Assume that the same material is used for shaft and key and that of crushing stress is twice the value of its shear stress .The maximum torque is 25% greater than the full load torque. The shear stress for C.I. is 14N/mm^2	**07**
Q.4	**(a)**	Derive an equation for torque calculation for lifting the load in power screws.	**07**
	(b)	Determine the ratio of torque required to raise and lower the load from the following data. Load=20KN,Pitch=8mm,Dia. Of screw=40mm,coefficient of friction=0.1	**07**
		OR	
Q.4	**(a)**	What do you mean by overhauling and self-locking of screw?	**07**
	(b)	Calculate required height of the nut for simple screw jack from the following data.(1)The load to be lifted W is 150KN.(2)Compressive stress σc=125/mm^2(3)Bearing pressure 18N/mm^2 for nut.	**07**
Q.5	**(a)**	Describe interchangeability and it's advantages.	**07**
	(b)	Explain any six AUTOCAD command you know.	**07**
		OR	
Q.5	**(a)**	Briefly explain general procedure for lever design.	**07**
	(b)	Explain three basic types of levers with practical examples.	**07**

****