Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (OLD) EXAMINATION – WINTER 2018

Subject Code:131902 Date:28/11/2018

Subject Name:Machine Design & Industrial Drafting

Time:10:30 AM TO 01:30 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)**	Classify the different types of load & Explain each In brief.	**04**
	(b)	Differentiate between (with neat sketch): 1) Crushing and Compressive stresses 2) Torsional and Transverse shear stress	**04**
	(c)	Define factor of safety and state the important factors affecting the factor of safety	**03**
	(d)	State the difference between shaft, axle and spindle.	**03**
Q.2	**(a)**	Classify the different types of riveted joints? Explain the terms with the sketches- Pitch, Margin, Transverse pitch, Diagonal pitch. Show by neat sketches the various failure of rivet joint.	**07**
	(b)	Explain the design process for socket and spigot cotter join	**07**
		OR	
	(b)	Design a knuckle joint to connect two rods subjected to tensile force of 50 KN. The rods and pin are made of plain carbon steel 30C8. The permissible stresses are $\sigma_t = \sigma_c = 80$ MPa and $\tau = 40$MPa	**07**
Q.3	**(a)**	Draw a neat sketch of a protected type flange coupling and write the design procedure with the design equation for different failure criteria.	**07**
	(b)	Briefly explain general procedure for lever design with necessary cross section.	**07**
		OR	
Q.3	**(a)**	Define following: (1) Arm of lever, (2) Leverage, (3) Displacement ratio and Differentiate between simple and compound lever.	**07**
	(b)	What is keyway? How is its effect considered in shaft design? Derive strength equations of sunk key based on shear and compression failures.	**07**
Q.4	**(a)**	Compare the weight, strength and rigidity of a hollow shaft of same external diameter as that of solid shaft. Both the shafts are made of same material. Assume that the diameter ratio for the hollow shaft as 0.6.	**07**
	(b)	Attempt the following (i) What do you understand by self-locking and overhauling of screw? (ii) Show that the efficiency of self-locking screws is less than 50 %	**07**
		OR	
Q.4	**(a)**	Derive an equation for torque required to raise (lift) load by square threaded screw.	**07**
	(b)	Find the diameter of a solid steel shaft to transmit 20 kW at 200 r.p.m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter considering the ratio of inside to outside diameters as 0.5.	**07**
Q.5	**(a)**	Classify and explain the types of welded joints with neat sketches and weld symbols	**07**
	(b)	What is magnitude of tolerance? Give the list of 6 manufacturing methods along with the recommended tolerance grade	**07**
		OR	
Q.5	**(a)**	Explain following AutoCAD command: (1) Offsetting (2) Trimming (3) Chamfering (4) Rectangle (5) Ellipse (6) Arc (7) Polygon	**07**
	(b)	What is fit? Explain different types of fits with applications.	**07**

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