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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-V Examination-Nov/Dec.-2011

Subject code: 151805 **Date: 01/12/2011**

Subject Name: Elementary Design and Drawing **Time: 2.30 pm -5.00 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)**	Explain following terms in connection with design of Machine Elements. Endurance Limit, Fatigue, Size Factor, Notch Sensitivity.	**07**
	(b)	Explain Heat Treatment Process Of Steels.	**07**
Q.2	**(a)**	Clearly Explain "Stress Concentration Effect". State few examples of Stress Concentration in Machine Parts.	**07**
	(b)	Define the following Mechanical Properties and their importance in design. Ductility, Brittleness and Hardness.	**07**
		OR	
	(b)	Describe design procedure of a Machine. Illustrate your answer with suitable example.	**07**
Q.3	**(a)**	Advantages and Disadvantages of Riveted and Welded Joints.	**07**
	(b)	A double riveted double cover butt joint in plates 20 mm thick is made with 25 mm dia. Rivets at 100 mm pitch. The permissible stresses are σ_t = 120 MPa, τ = 100 MPa, σ_c = 150 MPa Find efficiency of joints taking strength of rivet in double shear as twice than that of single shear.	**07**
		OR	
Q.3	**(a)**	Give Classification of bearings in detail with sketch.	**07**
	(b)	75 mm dia. Full bearing runs at 400 r.p.m. It is 75 mm long and is subjected to radial load of 2500 N. Radial clearance is 0.03 mm. Viscosity of lubricant is 16 Cp. Design following. Minimum film Thickness, Co-efficient of Friction, Loss of Power due to Friction.	**07**
Q.4	**(a)**	Design a Cotter Joint to support a load varying from 30 KN in compression to 30 KN in tension. Tensile Stress = Compressible Stress = 50 MPa Shear Stress = 35 MPa and Crushing Stress = 90 MPa	**07**
	(b)	Define: Cyclic Stress, Fluctuating Stress, Repeated Stress, Alternating Stress.	**07**
		OR	

Q.4	**(a)**	Explain Clutch, Break and Coupling with their applications.	**07**
Q.4	**(b)**	A shaft supported at the ends in ball bearings carries a straight tooth spur gear at its mid span and is to transmit 7.5 Kw at 300 r.p.m. The pitch circle diameter of the gear is 150 mm. The distance between the centre line of bearings and gear are 100 mm each. If the shaft is made of steel and the allowable shear stress is 45 MPa, determine the diameter of the shaft. The pressure angle of the gear may be taken as 20°.	**07**
Q.5	**(a)**	State different types of Belt Drives. Give their Merits and De-merits.	**07**
	(b)	A Single Plate Clutch effective on both sides is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner diameters of frictional surface if the coefficient of friction is 0.255, ratio of diameters is 1.25 and the maximum pressure is not to exceed 0.1 N/mm2. Also, determine the axial thrust to be provided by springs. Assume the theory of uniform wear.	**07**
		OR	
Q.5	**(a)**	What is Gear? Give Classification of Gear.	**07**
	(b)	110 mm dia. Full bearing runs at 1440 r.p.m. It is 110 mm long and is subjected to Radial load of 70 KN. Radial clearance 0.15 mm. Viscosity of lubricant is 16 Cp. Design following. Minimum film Thickness, Co-efficient of Friction, Loss of Power due to Friction.	**07**

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