Seat No.:		: Enrolment No	
		GUJARAT TECHNOLOGICAL UNIVERSITY	
		<b>BE - SEMESTER-VII EXAMINATION – SUMMER 2016</b>	
Su	bject	Code:171905 Date:05/05/201	.6
Su	bject	Name:Industrial Tribology (Department Elective - I)	
Ti	me:02	2:30 PM to 05:00 PM Total Marks: '	70
Ins	tructio		
	1. 2. 3.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	Explain the following Terms: (i)Viscosity Index (ii)Profilometry (iii) Friction (iv) Wear (v)Hydro-static lubrication (vi) Squeeze film lubrication (vii) Bearing modulus	07
	(b)	Define 'Tribology'. Give brief history of Tribology. Discuss basic methods of solutions of Tribological problems.	07
Q.2	(a)	What are the types of lubricants? Discuss the role of lubricants in solution of Tribological problem using suitable example.	07
	(b)	what are the geometrical properties of the surface? Discuss parameters of measurements of roughness of the surface. OR	U7
	(b)	A typical profilometer trace show a uniform triangular surface asperities having 0.05mm height and 0.25mm pitch. If the sample length taken is 2 mm then determine CLA and RMS value.	07
Q.3	(a) (b)	Explain different methods of measurements of friction. Write a short notes on: (i)Fretting (ii) Corrosive wear	07 07
Q.3	(a)	Derive the following equation for adhesive wear mechanism assuming spherical asperities:	07
		$V = \frac{1}{3} \frac{W.x}{H}$	
	(b)	where, $W = Load$ on asperity, $H=$ hardness of material, $x =$ distance State the laws of friction. Write a short note on ploughing friction.	07
Q.4	(a)	Derive the equation of pressure distribution for infinite width tapered-pad bearing. State the assumptions made.	07
	(b)	A $360^{\circ}$ hydrodynamic short journal bearing of is to be designed to support a radial load of 5.5 KN. The rotation of journal is 5000rpm. The eccentricity ratio is 0.6. If the viscosity of lubricating oil is $45 \times 10^{-9}$ Ns/mm <sup>2</sup> and supplied at a rate of 0.5 l/min to the bearing, Determine the dimensions of the journal, bearings and minimum oil film thickness. Take l/d ratio as 0.4.	07
Q.4	(a)	Derive the equation of pressure distribution for hydrostatic step bearing. State the assumptions	07
	(b)	A guide-way bearing of machine tool is having a width of 140mm, length of 700mm with a sliding velocity 2.5 m/s. The minimum oil film thickness is 16 $\mu$ . Absolute viscosity of oil is $0.025 \times 10^{-6}$ MPa-s. Assuming film thickness ratio as 2, determine the load carrying capacity, co-efficient of friction, power lost in friction and film thickness at a distance of 450mm from leading edge.	07
Q.5	(a) (b)	Differentiate between hydro-static and hydro-dynamic lubrication. Write a short note on bearing materials.	07 07
Q.5	(a) (b)	Write a short note on lubrication in metal working. Explain with neat sketch working principle of:(i) EHD lubrication (ii) Gas lubrication *********	07 07
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