C.U.SHAH UNIVERSITY
Winter Examination-2019

Subject Name : Industrial Tribology
Subject Code: 4TE07ITR1   **Branch: B.Tech (Mechanical)**
Semester : 7   **Date : 22/11/2019**   **Time : 10:30 To 01:30**   **Marks : 70**
Instructions:
  (1) Question 1 is compulsory.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1		**Attempt the following questions:**	**(14)**
	1)	Define the term 'Tribology'.	**2**
	2)	Give example of solid film lubricant.	**2**
	3)	State the Coulomb's law of friction.	**2**
	4)	Define the term "Kinematic Viscosity".	**1**
	5)	Write note on SAE grading oil.	**1**
	6)	What do you understand by 10W/30 motor oil.	**1**
	7)	Write down basic objective of lubrication.	**1**
	8)	Draw a sketch of tilting pad thrust bearing.	**1**
	9)	What is viscosity index?	**1**
	10)	What is flash point?	**1**
	11)	What is dry friction?	**1**

Attempt any four questions from Q-2 to Q-8

Q-2	(a)	Explain geometrical properties of surface with neat sketch.	**7**
	(b)	Discuss the method of surface measurement in detail with neat sketches.	**7**
Q-3	(a)	Define the term "Wear". State the suggestions to reduce or remove the wear from the machinery in the early design stages with suitable example.	**7**
	(b)	Enlist the factors affecting wear. Discuss all in detail.	**7**
Q-4	(a)	What is hydrostatic step bearing? Derive equation for load carrying capacity of hydrostatic step bearing.	**7**
	(b)	Explain in detail recycling of used oil, process of recycling and method of disposal of used oil.	**7**
Q-5	(a)	Sate the assumptions to derive Petroff's equation for hydrodynamic journal bearing and also derive the equation for the same.	**7**
	(b)	Discuss with neat sketches the mechanism of pressure development in hydrodynamic thrust bearing.	**7**
Q-6	(a)	Derive Reynolds's equation for hydrodynamic lubrication. Also state the	**7**

assumptions to derive Reynolds's equation for hydrodynamic lubrication.

(b) Define and discuss the phenomenon of 'Adhesive wear and Abrasive wear'. **7**

Q-7 (a) A rectangular plate of 500*400 mm is placed over a plane stationary surface. The two are separated by an oil-film of thickness 0.25 mm. The viscosity of oil is 80 cP. Determine the force required to push the plate at a speed of 5 m/s. **7**

(b) Write a short note on 'Wear resistant materials'. **7**

Q-8 (a) What is tribological surface? Explain, with neat sketch, the different layers of tribological surface. **7**

(b) Draw and discuss construction and working Red wood viscometer. **7**