Mechanical Eng. Dept. | **Lubrication in Machines**

ME 456 | **April 2021**

Taibah University

College of Engineering

Make-Up Exam for Midterm (Open Book)

Time allowed: 60 minutes

Student Name: …….. **University #:**……..

Question (1) [6 marks]

a- Write down (at least 3) drawbacks of the friction in machines.

b- Write (with sketch) the main regimes of lubrication systems in machines and how to specify its type.

c- Write (at least 5) differences between the rolling and sliding bearings.

Question (2) [4 marks]

Explain in details the procedures of performing the friction and wear test on the **Pin-Disc** machine

Problem (3) [5 marks]

A pick-up truck carrying a load of mass **150 kg** decelerates to a sertain traffic light at **1.4 m/s^2**. Find the smallest possible value of the coefficient of friction, if the load does not slip.

Problem (2) [15 marks]

The following figure shows a hydrostatic bearing having a rectangular recess of the following specifications: -

Radial load = **1 ton**

Shaft speed = **500 RPM**

Bearing diameter **= 120 mm**

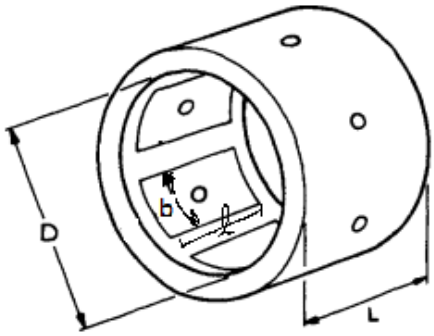
Bearing length **= 120 mm**

Radial clearance = **100 μm**

Recess length = **60 mm**

Recess width = **30 mm**

Oil viscosity= **100 mPa.s**



Find the following:

a- Pressure in the recess

b- Oil flow rate entering the recess

c- Friction torque

d- Power loss

e- Temperature rise, *assume any missed data*