

	Alexandria Higher Institute of Engineering & Technology (AIET)		
	Mechatronics Department		Third Year
	EME312	Fluid Mechanics	Midterm, April, 1, 2012
	Examiners:	Dr. Rola Afify and Committee	Time: 1.5 hours

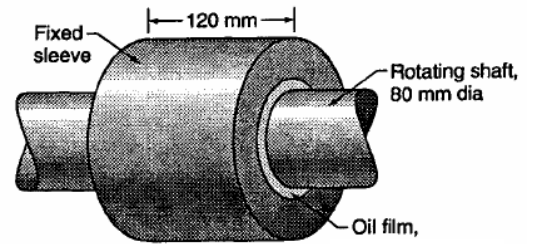
Answer the following questions:

Question one (6 marks)

A) Define (with mentioning units):

1. Density.
2. Kinematic viscosity.
3. Vapor pressure of liquids.

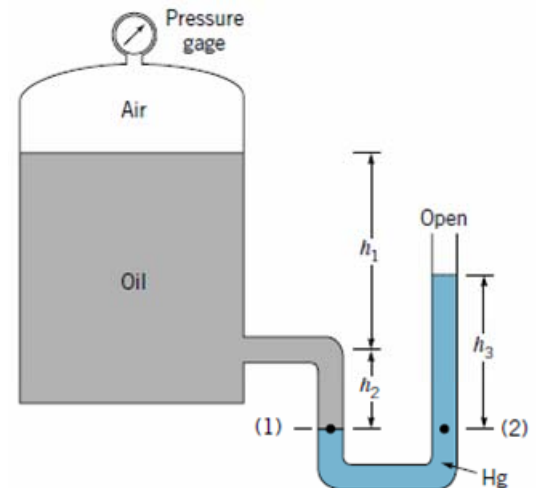
B) A journal bearing consists of an 80mm diameter shaft in an 80.4mm diameter and a 120mm long sleeve, the clearance space is assumed to be uniform and is filled with oil having an absolute viscosity of 0.11 N.s/m^2 . Calculate the needed power to overcome viscosity when the shaft turns at 150 rpm.



Question two (6 marks)

A) Explain, with neat sketch, Pressure intensifier's function.

B) A closed tank contains compressed air and oil ($\gamma_{oil} = 0.9$) as shown in figure. A u-tube manometer using mercury ($\gamma_{mercury} = 13.6$) is connected to the tank as shown. For column heights $h_1 = 91 \text{ cm}$, $h_2 = 15 \text{ cm}$, $h_3 = 22 \text{ cm}$, determine the pressure gage's reading.



Question three (8 marks)

A) Differentiate between:

1. Steady and unsteady flow.
2. Laminar, transient and turbulent flow.

B) Water flows up AB (5m long, 40 mm diameter), then along BC (3m long, 30 mm diameter). The measured pressure at A is 275 kPa. Find the pressure at C if the flow rate is 2.0 L/s (neglect losses).

C) Draw T.E.L. and H.G. for a venturi meter, mentioned that the flow is ideal and the pressure is negative at throat.

