	Alexandria Higher Institute of Engineering & Technology (AIET)		
	Mechatronic Department		Third Year
	EME312	Fluid Mechanics	Midterm, May, 5, 2011
	Examiners:	Dr. Rola Afify and Committee	Time: 1.5 hours

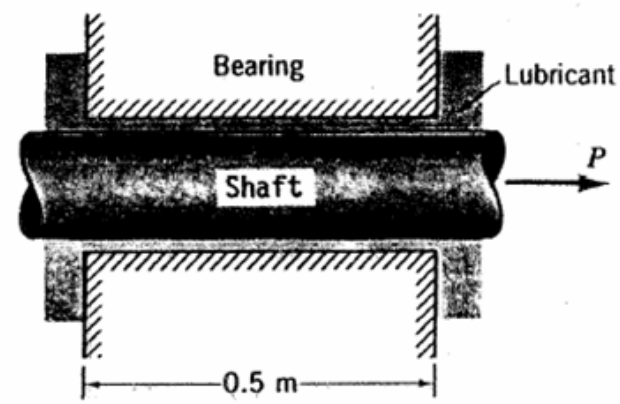
Answer the following questions:

Question one (7 marks)

A) Define: Density, Streamline and Steady flow.

B) Sketch the relation between viscosity and temperature for a certain fluid.

C) A 25 mm diameter shaft is pulled through a cylindrical bearing as shown in Figure. The lubricant that fills the 0.3 mm gap between the shaft and bearing is oil having a kinematic viscosity of 8 x 10^{-4} m^2/s and a specific gravity of 0.91. Determine the force P required to pull the shaft at a velocity of 3 m/s. Assume the velocity distribution in the gap is linear.

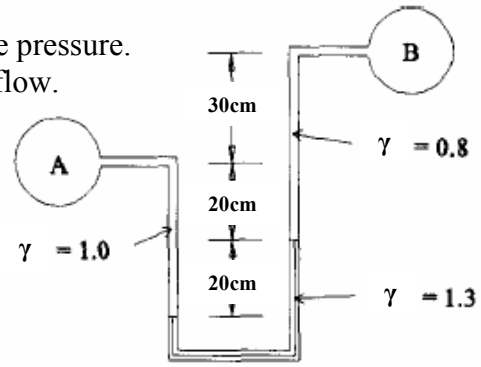


Question two (7 marks)

A) State the relation between absolute, atmospheric and gage pressure.

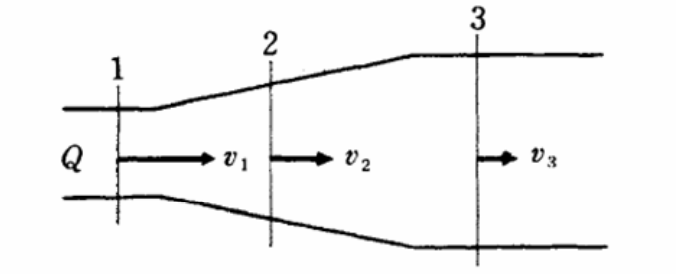
B) Differentiate between Laminar, Transient and Turbulent flow.

C) A manometer is connected between two pipelines, A and B shown in figure. What is the pressure difference between A and B expressed as meters of water?



Question three (6 marks)

Water is flowing in the conduit shown in figure. If the flow rate Q is 8 lit/s and the diameters d_1, d_2 and d_3 at sections 1, 2 and 3 are 50, 60 and 100 mm respectively, find the flow velocities v_1, v_2 and v_3. If the pressure P_1 at section 1 is 24.5 kPa, what is the pressure P_3 at sections 3? Also, draw T.E.L. and H.G. for the conduit along the three sections (neglect losses).



Good Luck

Dr. Rola Afify