



**Alexandria Higher Institute of Engineering & Technology (AIET)**

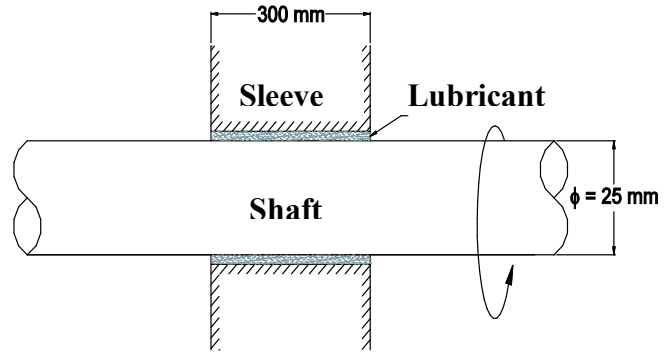
Department of: Industrial		Second Year	2 <sup>nd</sup> Year
ME251	Fluid Mechanics		Midterm-of-Semester-1 Exam, Nov., 1, 2012
Examiners:	Dr. Rola Afify and committee		Time: 1.5 hour

**Answer the following questions:**

**Question one: (7 marks)**

A) Define: Specific weight - vapor pressure of liquid - viscosity.

B) A 25mm diameter shaft is rotated in a 26.2mm diameter 300mm long sleeve containing oil ( $\mu = 0.44 \text{ Pa}\cdot\text{s}$ ) as shown in Figure. Estimate the torque required to rotate the shaft at a speed of 1800 rpm. Also, determine the power lost in viscous friction.

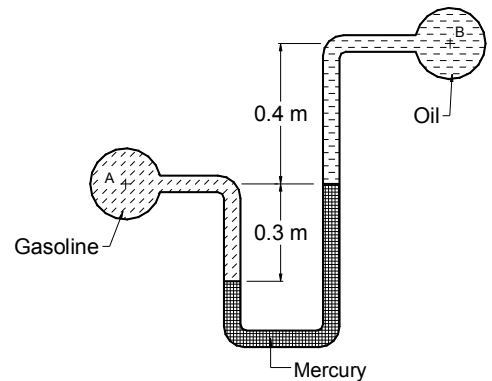


**Question Two: (7 marks)**

Show using neat sketch of the following:

- i) The relation between Absolute, Atmospheric, and guage pressure.
- ii) U-tube with one leg enlarged.
- iii) Hydraulic Jack.

B) In Figure, pipe (A) contains gasoline (sp. gr. = 0.7), pipe (B) contains oil (sp. gr. = 0.9), and the manometer fluid is mercury (sp. gr. = 13.6). Determine the pressure difference between A and B.

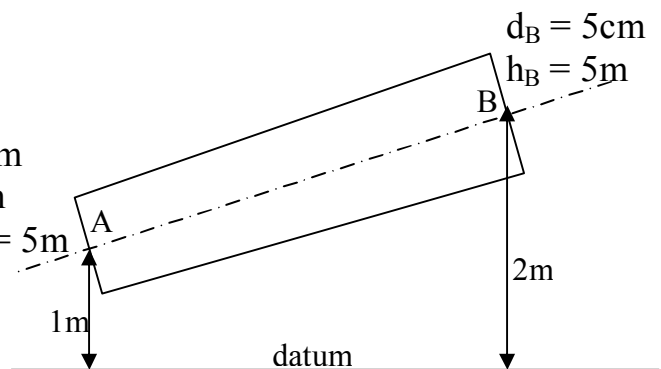


**Question Three: (6 marks)**

- A) Compare between the following:
  - i) Uniform and Non-uniform flow.
  - ii) Laminar, Transient, and Turbulent flow.
  - iii) Venturi and Orifice meter.

B) Water is flowing through a pipe. Its diameter changes from 1cm at section (A) 1m above datum to 5cm at section (B) 2m above datum. The pressure head of water is 2m at section (A) and 5m at section (B). The kinetic energy at section (A) is 5m. Determine:

$d_A = 1 \text{ cm}$   
 $h_A = 2 \text{ m}$   
 $v_A^2 / 2g = 5 \text{ m}$



- i) The velocity at B.
- ii) Direction of flow.
- iii) Losses.