

Name: _____

Mansoura University
Faculty of Engineering
Dept. of Mech. Power Eng.
Course Title: Fluid Mechanics
Course Code: MPE171



November 2019
Exam Type: mid-term
Time: 60 Minutes
Full Mark: 30

Answer all the following questions.

- 1- A Newtonian fluid fills the gap between a shaft and a concentric sleeve. When a force of 788 N is applied to the sleeve parallel to the shaft, the sleeve attains a speed of 2 m/s. If a 1400 N force is applied, what speed will the sleeve attain? [10 Marks]
- 2- A cylindrical tank contains water at a height of 55 mm, as shown in Fig. 1. Inside is a smaller open cylindrical tank containing Kerosene (S.G = 0.8) at height h . If $P_B = 13.4$ kPa gage and $P_C = 13.42$ kPa gage, what are gage pressure P_A and height h of Kerosene. Assuming that Kerosene is prevented from moving to the top of the tank. [10 Marks]
- 3- Find the net hydrostatic force per unit width on the rectangular panel AB in Fig. 2 and determine its line of action. [10 marks]
- 4- A solid block, of specific gravity 0.9, floats such that 75% of its volume is in water and 25% of its volume is in fluid X, which is layered above the water. What is the specific gravity of fluid X? [10 marks]

Good Luck

Dr. Mohamed Mansour

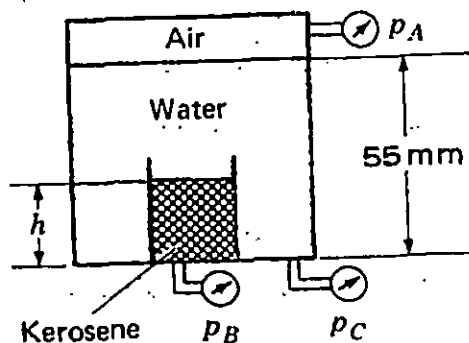


Fig. 1

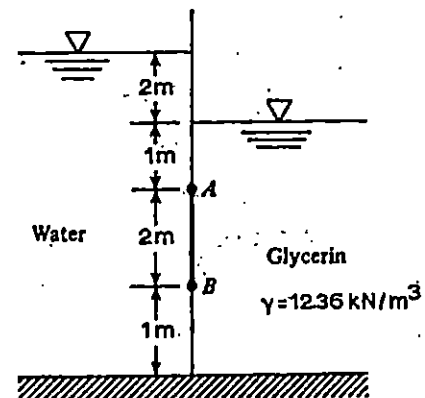


Fig. 2