Biomedical Engineering Program
Midterm exam. In Fluid mechanics (MPE171) 2018-2019
Time Allowed 60 minutes (20 total marks)

Name : .....

Section : .....

Question (1) : For the shaft-bearing arrangement shown in Fig. 1, the lubricant has a kinematic viscosity of 3×10^{-5} m^2/s, and specific gravity of 0.8. If the the power dissipated in friction is 515 Watt , what the rotational speed of the rotating shaft N, in rpm.

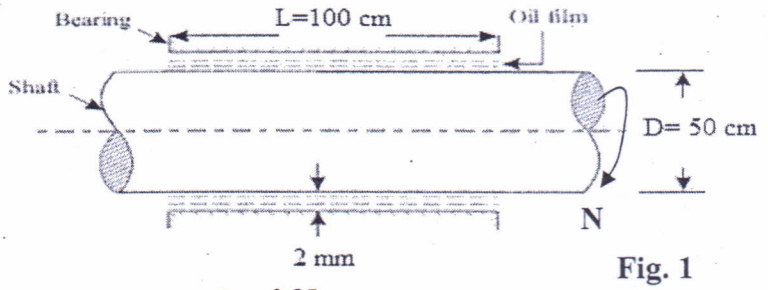

Fig. 1

Question (2) : Determine the mass of piston in the Fig. 2 if the piston area is 0.1 m^2.

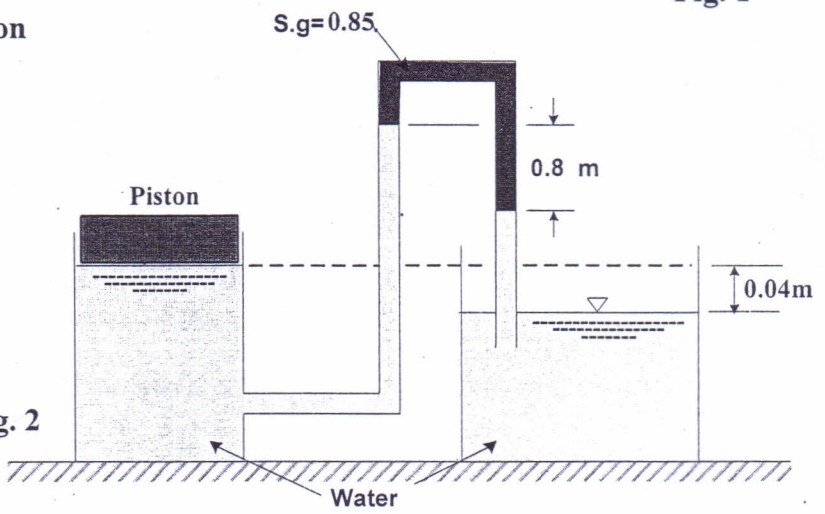

Fig. 2

Question (3) :

Draw the pressure distribution on the gate OA. Calculate the following:

a) the hydrostatic force on the gate (2 m wide) and the location of their line of action. b) the horizontal reaction P exerted by the wall at point A.

Question (4) : For the shown in Fig. 4, calculate the following: a) the specific gravity of the hollow cylinder. b) the metacenter height $\overline{GM}$ and show that is stable or not?

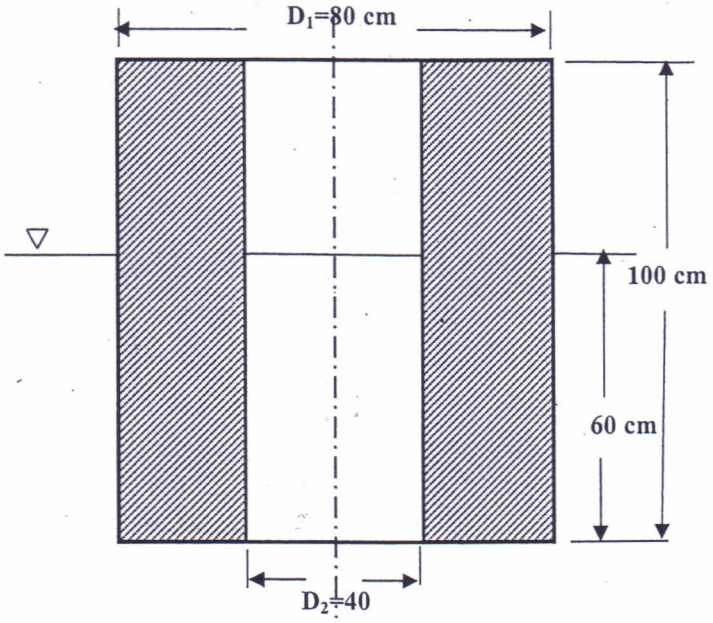

Fig. 4

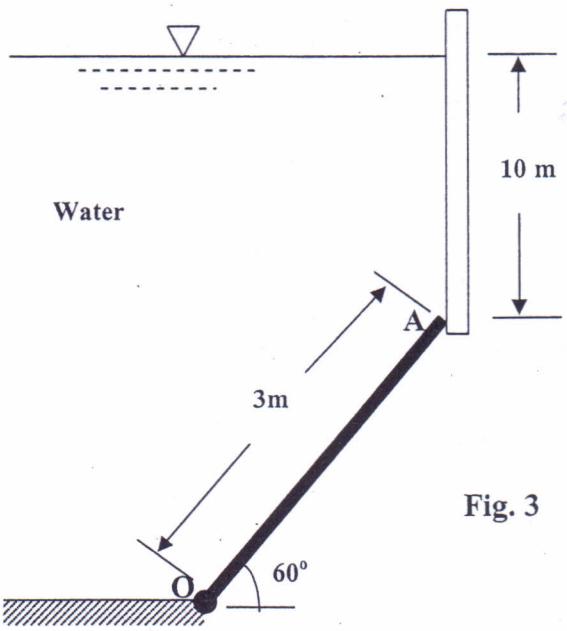

Fig. 3

Good Luck *Dr. Ahmed Abd Elsalam*