淡江大學九十一學年度碩士班招生考試試題

系別：機械與機電工程學系　　　　科目：流 體 力 學　　　　69-1

准帶項目請打「○」否則打「×」	
計算機	字典
O	X

本試題共 2 頁

1.

The jet of oil (s.g.=0.90) falls 20 ft from the end of a vertical pipe and strikes a splitter plate as shown in Fig.1. One half of the jet is deflected horizontally and the other half continues to fall vertically. What is the vertical component of the force necessary to hold the splitter plate in position? Neglect friction, the weight of the fluid in contact with the splitter, and show the control volume with all forces and velocities labeled.　　　　(20%)
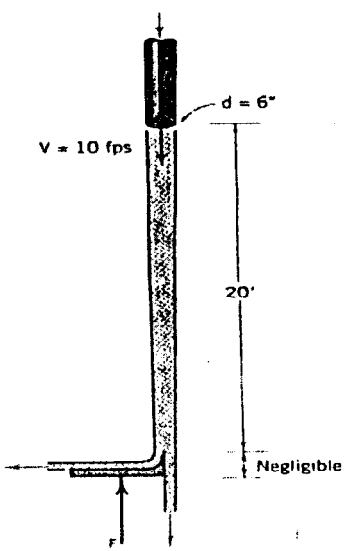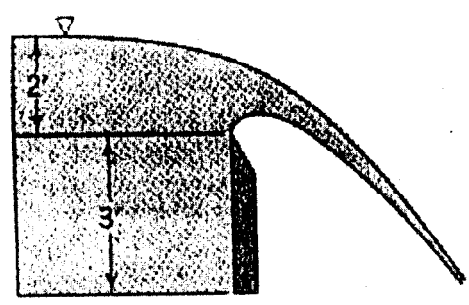

Fig.1　　　　　　　　　　Fig.2

2.

If the two-dimensional flowrate over this sharp crested weir is 10 cfs/ft as shown in Fig.2, what is the thickness of the sheet of falling water at a point 3 ft below the weir crest?　　　　(20%)

3.

The flow of a uniform, incompressible fluid is described by the equations

$$v_r = (2\pi r)^{-1} \quad \text{and} \quad v_t = -(2\pi r)^{-1}.$$

a) Sketch this flow,　　　　(5%)

b) Show that it satisfies the differential continuity equation,　　　　(5%)

c) Find the magnitude and direction of the velocity,　　　　(5%)

d) Determine if the continuity equation for a finite control volume $r \leq r_0$ is satisfied.　　　　(5%)

◄ 注意背面尚有試題 ►

4.

For the *forced vortex* flow the velocities are $v_t = \omega r$ and $v_r = 0$.

a) Plot the streamlines of this flow,　　　　　　　　　　　　(5%)

b) Calculate the accelerations,　　　　　　　　　　　　　　(5%)

c) Calculate the vorticity.　　　　　　　　　　　　　　　　(5%)

c) Are there any interesting points in the flow?　　　　　　(5%)

5.

The cylinder (Fig.3) is 2.4m long and is pivoted at O. Calculate the moment (about O) required to hold it in position.　　　　　　　　　　(20%)
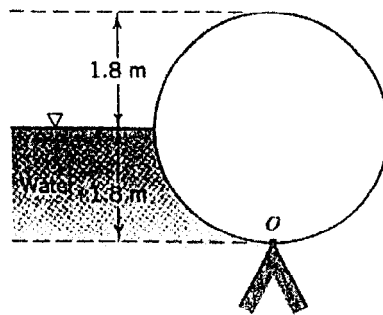

Fig. 3