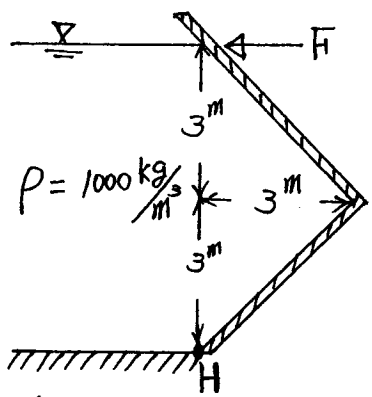
國立交通大學 96 學年度碩士班考試入學試題

科目：流體力學(3082) (3092)　　考試日期：96 年 3 月 18 日 第 2 節

系所班別：土木工程學系　　組別：土木所丙組一般生/丙組在職第 1 頁，共 1 頁

＊＊作答前請先核對試題、答案卷(試卷)與准考證之所組別與考科是否相符！【可使用計算機】

1. Estimate the discharge of water that a 3m wide concrete channel can carry, if the depth of flow is 2m and the slope of the channel is 0.0016. (Manning coefficient is 0.0015) (25%)
2. A 1/300 scale model of a spillway is tested. The discharge in the model is $0.2m^3/s$ .To what prototype discharge does this correspond ? If it takes 15min for a particle to float from one point to another in the prototype, how long would it takes a similar particle to transverse the corresponding path in the model ? (25%)
3. A two dimensional flow field with velocity $\vec{V} = -y\vec{i} + x\vec{j}$, (25%)
   a. Is this an incompressible flow field?
   b. Does a velocity potential exist? If so find it.
   c. Does a stream function exist? If so find it.
4. A 1m long gate, as shown in Fig. 1, is hinged at H. Determine the minimum horizontal force, F, required to hold the gate in place. Neglect friction at the hinge and the weight of the gate. (25%)



(Fig. 1)