

國立嘉義大學九十五學年度
土木與水資源工程學系碩士班招生考試試題

科目：流體力學

(如條件不足，請自行假設。可使用工程計算機)

1. 解釋名詞：(20%)

- (a) Friction velocity.
- (b) Streamline.
- (c) Moody chart.
- (d) Energy head.
- (e) Boundary layer displacement thickness.

2. Model tests are to be performed to study the flow through a large valve having a 2-ft-diameter inlet and carrying water at a flowrate of 30 cfs. The working fluid in the model is water at the same temperature as that in the prototype. Complete geometric similarity exists between model and prototype, and the model inlet diameter is 3 in. Determine the required flowrate in the model. (20%)

3. The mercury manometer of Fig 3 indicates a differential reading of 0.4 m when the pressure in pipe A is 30 mm Hg vacuum. Determine the pressure in pipe B. (20%)

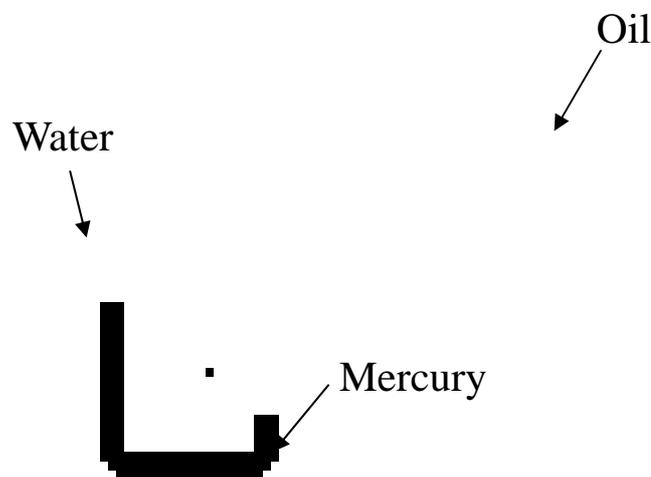


Fig 3

4. The velocity potential for a given two-dimensional flow field is $\phi = (5/3)x^3 - 5xy^2$. Show that the continuity equation is satisfied and determine the corresponding stream function. (20%)

5. The pressure drop needed to force water through a horizontal 1-in.-diameter pipe is 0.6 psi for every 12-ft length of pipe. Determine the shear stress at distance 0.3 in away from the pipe wall. (20%)