國立成功大學

115學年度碩士班招生考試試題

編　號：82

系　所：工程科學系

科　目：流體力學

日　期：0204

節　次：第 2 節

注　意：1.可使用計算機
2.請於答案卷(卡)作答，於試題上作答，不予計分。

1. (25%) A long water trough of triangular cross section is formed from two planks as is shown in Figure 1. A gap of 2.5 mm remains at the junction of the two planks. If the water depth initially was 0.6 m how long a time does it take for the water depth to reduce to 0.3 m?

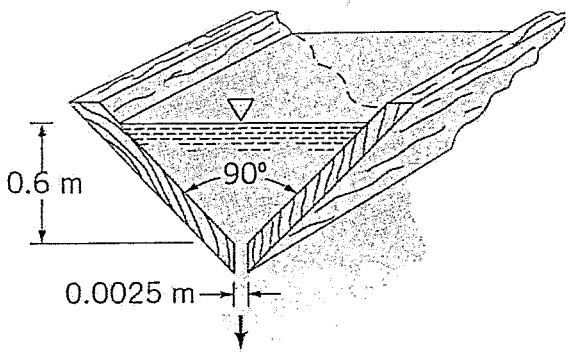

Figure 1

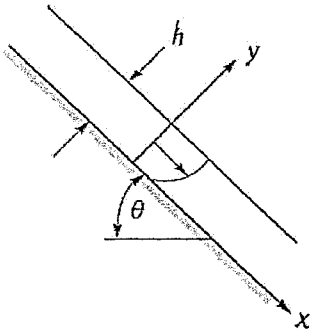

Figure 2

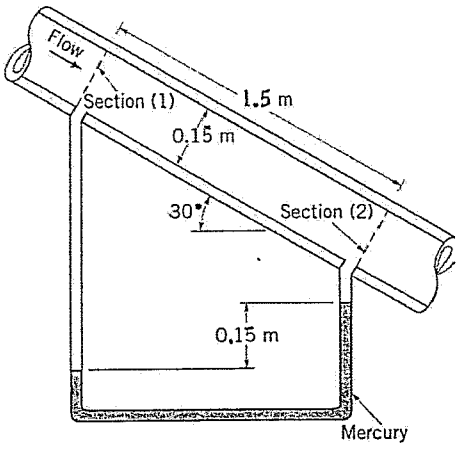

Figure 3

2. (25%) A liquid of constant density ρ and constant viscosity μ flows down a wide, long inclined flat plate (as shown in Figure 2). The plate makes an angle θ with the horizontal. The velocity components do not change in the direction of the plate, and the fluid depth, h, normal to the plate is constant. There is negligible shear stress by the air on the fluid. Find the velocity profile $u(y)$, where u is the velocity parallel to the plate and y is measured perpendicular to the plate. Write an expression for the volume flowrate per unit width of the plate.
3. (25%) Water flows steadily down the inclined pipe as indicated in Figure 3. Determine the following: (a) the difference in pressure $p_1 - p_2$, (b) the loss between sections (1) and (2), (c) the net axial force exerted by the pipe wall on the flowing water between sections (1) and (2). (Mercury SG:13.6)
4. (25%) Explain the physical meaning and the application of the following terms: (a) Reynold number, (b) Bernoulli's equation, (c) Conservation of momentum, (d) Reynold transport theorem, (e) Buckingham Pi theorem.