

※ 考生請注意：本試題 可 不可 使用計算機

1. A trapezoidal brick-lined channel ($n = 0.016$) must carry $270 \text{ m}^3/\text{s}$ a distance of 8 km with a head loss of 4 m. The bottom width is 9 m and has side slopes of 1 horizontal to 1 vertical. What is the velocity (m/s)? (20%)
2. In Fig. 2, $L_1 = 3700 \text{ ft}$, $D_1 = 2 \text{ ft}$, and $\epsilon_1 = 0.001 \text{ ft}$; $L_2 = 2700 \text{ ft}$, $D_2 = 7 \text{ in.}$, and $\epsilon_2 = 0.0001 \text{ ft}$; $L_3 = 4700 \text{ ft}$, $D_3 = 21 \text{ in.}$, and $\epsilon_3 = 0.0007 \text{ ft}$; and $p = 2.00 \text{ slugs/ft}^3$, $\nu = 0.00004 \text{ ft}^2/\text{s}$, $P_A = 97 \text{ psi}$, $Z_A = 127 \text{ ft}$, and $Z_B = 77 \text{ ft}$. For a total flow of 27 cfs, determine flow through each pipe and the pressure at B. (20%)

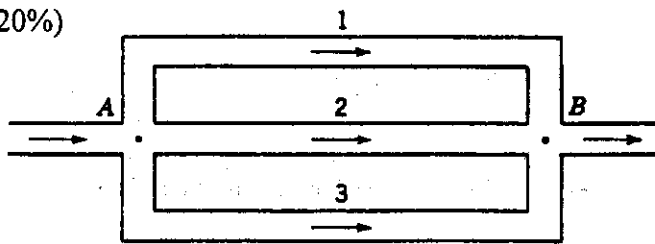


Fig. 2

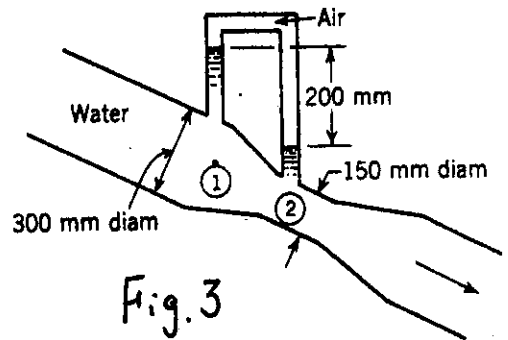


Fig. 3

3. Neglecting losses, find the discharge through the venturi meter of Fig. 3. (20%)
4. For linear stress variation over the base of the dam and with the addition that the hydrostatic uplift varies linearly from 25 m at A to zero at the toe of the dam of Fig. 4
 - (1). locate where the resultant crosses the base and (10%)
 - (2). compute the maximum and minimum compressive stresses at the base. (10%)

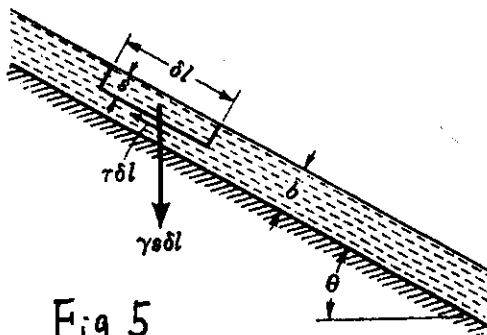


Fig. 5

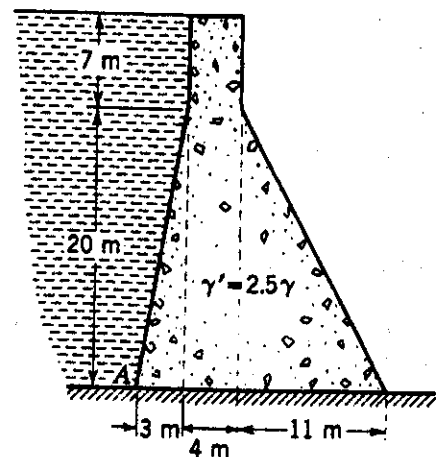


Fig. 4

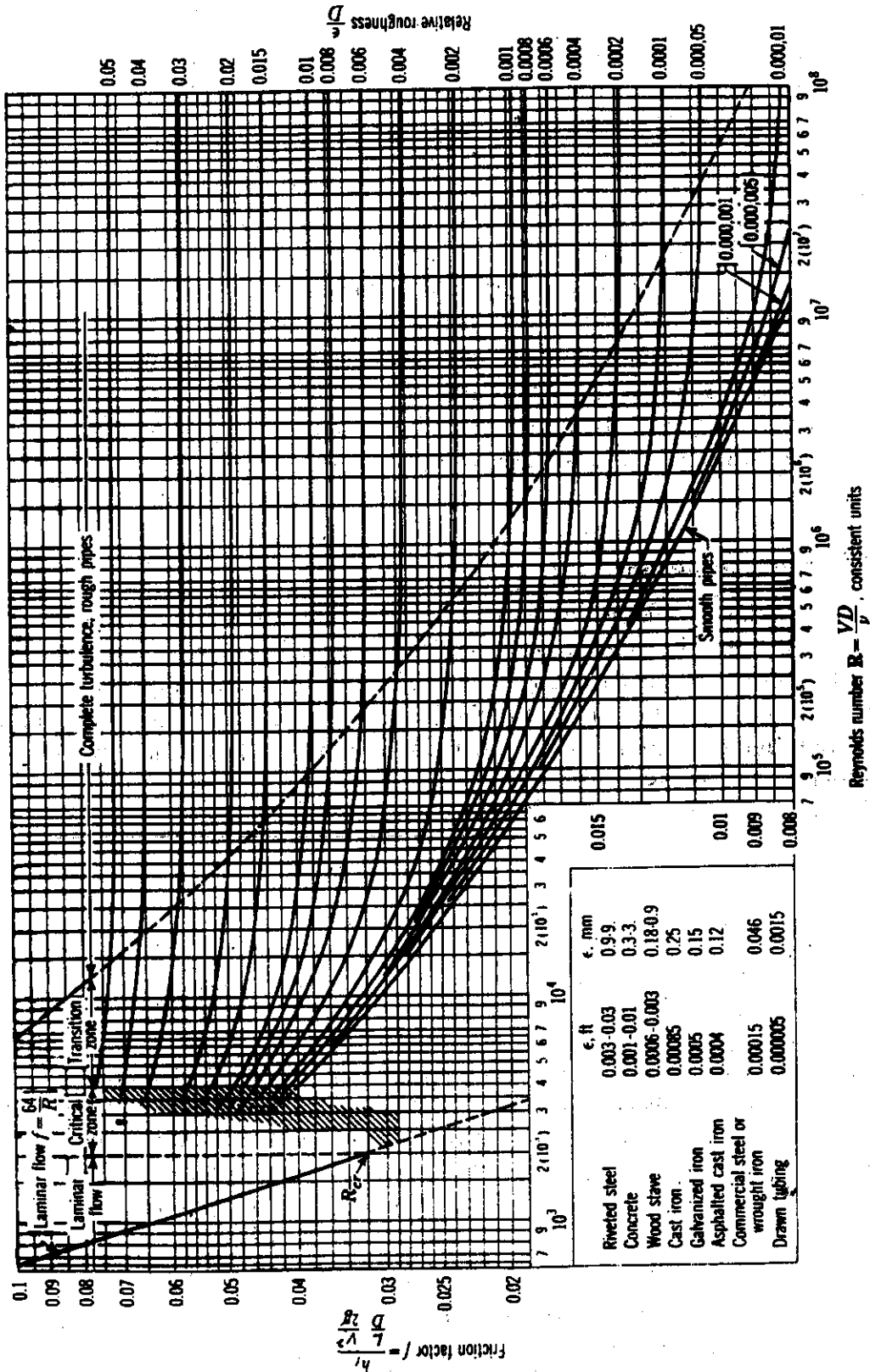
5. With a body, as in Fig. 5, for uniform flow of a thin lamina of liquid plane, please derive the velocity distribution and the flow rate per unit width. (20%)

系所組別： 環境工程學系乙組

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Moody diagram.