

1. Please Explain the Following Item: (10%).
  - (1). Normal Depth    (2). Gradually Varied Flow
  - (3). Critical Flow    (4). Kinetic energy correction factor
  - (5). Continuity Equation
2. A spherical dust particle at an altitude of 80 km. Its size and specific gravity are  $25 \mu\text{m}$  and 2.5, respectively. Assume the viscosity  $\mu$  of air, in poises, to be express by  $\mu = A - By$ , where  $A = 10^{-4}$  and  $B = 10^{-9}$ , and  $y$  in meters measured from sea level. Estimate the time for these particles to reach sea level. Neglect air currents and wind effects. (10%)
3. Please draw the figures of control volume for a fluid flow and derive the Bernoulli Equation from the Euler's Equation along a streamline. (20%)
4. Please draw a figure and derive the equation of Losses Due to Sudden Expansion in a pipe flow. (20%)
5. Please determine the flow through each line of Fig.5,  $n=2$ . (20%)

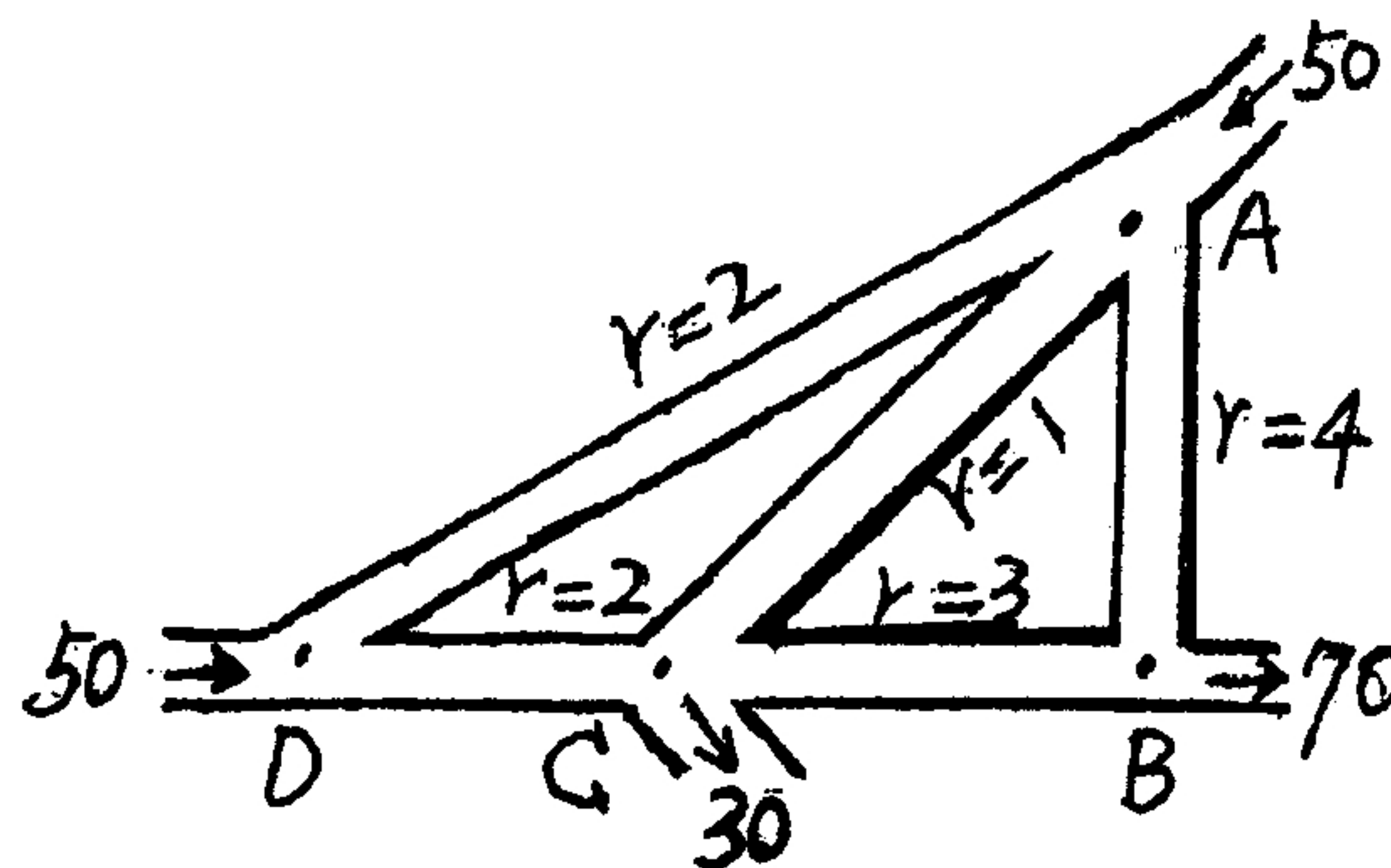


Fig. 5

6. Please draw a figure and derive the following equation:
  - (1). Chézy Formula (10%)
  - (2). Manning Formula. (10%)