

**Department of Civil Engineering**  
**VI Semester B.E.**  
**Fluid Mechanics -II**  
**Assignment No. II**

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Example 1: A pipe 1 m diameter and 15 km long transmits water of velocity of 1 m/sec. The friction coefficient of pipe is 0.005. Calculate the head loss due to friction?

Example 2: A pipe transmits water from a tank A to point C that is lower than water level in the tank by 4 m. The pipe is 100 mm diameter and 15 m long. The highest point on the pipe B is 1.5 m above water level in the tank and 5 m long from the tank. The friction factor ( $4f$ ) is 0.08, with sharp inlet and outlet to the pipe. a. Determine the velocity of water leaving the pipe at C? b. Calculate the pressure in the pipe at the point B?

Example 3: A pipe, 40 m long, is connected to a water tank at one end and flows freely in atmosphere at the other end. The diameter of pipe is 15 cm for first 25 m from the tank, and then the diameter is suddenly enlarged to 30 cm. Height of water in the tank is 8 m above the centre of pipe. Darcy's coefficient is 0.01. Determine the discharge neglecting minor losses?

Example 4: Two pipes are connected in parallel between two reservoirs that have difference in levels of 3.5 m. The length, the diameter, and friction factor ( $4f$ ) are 2400 m, 1.2 m, and 0.026 for the first pipe and 2400 m, 1 m, and 0.019 for the second pipe. Calculate the total discharge between the two reservoirs?

Example 5: Two reservoirs have 6 m difference in water levels, and are connected by a pipe 60 cm diameter and 3000 m long. Then, the pipe branches into two pipes each 30 cm diameter and 1500 m long. The friction coefficient is 0.01. Neglecting minor losses, determine the flow rates in the pipe system?

Example 6: Two tanks A and B have 70 m difference in water levels, and are connected by a pipe 0.25 m diameter and 6 km long with 0.002 friction coefficient. The pipe is tapped at its mid point to leak out 0.04 m<sup>3</sup> /s flow rate. Minor losses are ignored. Determine the discharge leaving tank A? Find the discharge entering tank B?

Example 7: A tank transmits 100 L/s of water to the point C where the pressure is maintained at 1.5 kg/cm<sup>2</sup>. The first part AB of the pipe line is 50 cm diameter and 2.5 km long, and the second part BC is 25 cm diameter and 1.5 km long. The friction coefficient is 0.005 and minor losses are ignored. Assuming level at C is (0.0); find the water level (L) in the tank?

Example 8: Three water tanks A, B and C with water surface levels (100.00), (50.00) and (10.00) m are connected by pipes AJ, BJ and CJ to a common joint J of a level (45.00) m. The three pipes have the same length, diameter and friction coefficient. a) Calculate the head at the joint J? b) Determine the discharge in each pipe?

Example 9: Three water tanks A, B and C are connected to a joint J by three pipes AJ, BJ and CJ such that the water level in tank A is 40 m higher than tank B and 55 m higher than tank C. Each pipe is 1500 m long, 0.3 m diameter and  $f = 0.01$ . Calculate the discharges and directions of flow?

Example 10: For the pipe network as shown in fig. obtain the discharge in each pipe of the network by Hardy Cross method (Do maximum two iterations.)



