國立交通大學 94 學年度碩士班入學考試試題

科目名稱：流體力學(0072)　考試日期：94 年 4 月 17 日　第 2 節
系所班別：土木工程學系　　組別：丙組　　第 1 頁，共 2 頁
＊作答前，請先核對試題、答案卷（試卷）與准考證上之所組別與考試科目是否相符！！

1. Water is flowing in a 10. *ft* wide rectangular channel as shown in Fig. 1. Neglecting all energy losses, determine the possible depths of flow at the section B. (20%)
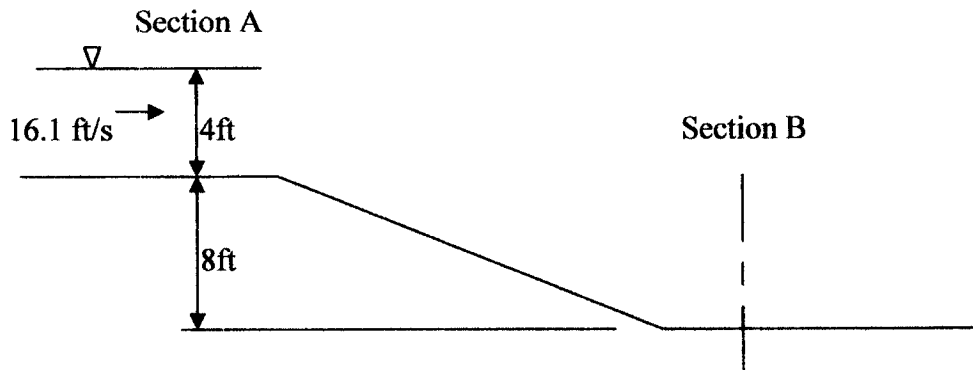
Section A

16.1 ft/s　4ft

Section B

8ft

Fig. 1 for problem 1 (Not in scale)

2. The cross section of a gate is shown in Fig. 2. Its dimension normal to the plane of the paper is 10 *m*, and its shape is such that $x = 0.2y^2$. The gate is hinged at O. Find the horizontal and vertical forces and the clockwise moment acting on the gate if the water depth is 0.2 *m*. (30%)
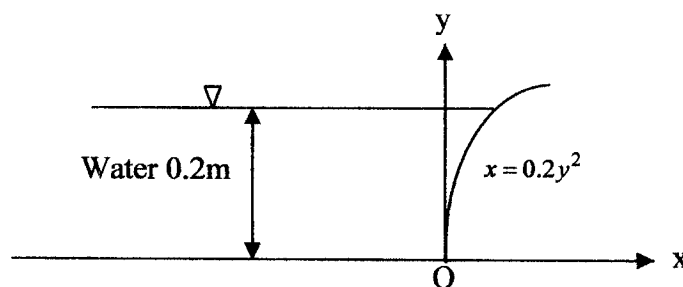
Water 0.2m

$x = 0.2y^2$

Fig. 2 for problem 2 (Not in scale)

3. A 1/36 scale model of a proposed dam is used to predict prototype flow conditions. If the design flood discharge over the spillway is $18,000 \, m^3/s$, what water flow rate should be established in the model to simulate this flow? (10%) If a velocity of $1.5 \, m/s$ is measured at a point in the model, what is the velocity at a corresponding point in the prototype? (10%)

4. The water supply reservoir shown in Fig. 3 has an average depth 20*m*, a surface area of 20 km^2, and an outlet whose centerline is 15 m below the water surface. If the outlet diameter is 1 m, what is the outflow and its associated velocity? (10%) What would be the draw downs (drop in water surface elevation) during one-week and one-day periods? (10%)
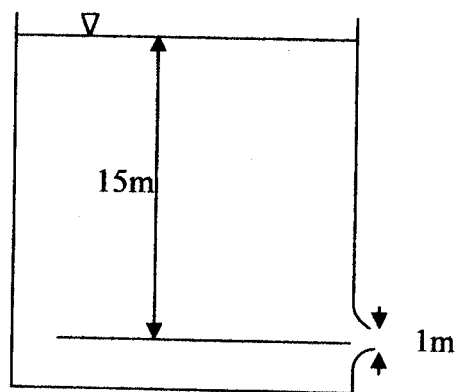

Fig. 3 for problem 4 (Not in scale)

5. What is the definition of kinematic viscosity and dynamic viscosity? (6%) What is the difference between the physical meanings of both definitions? (4%)