系所組別： 航空太空工程學系乙組

考試科目： 工程力學　　　　　　　　　　　　　　　　考試日期：0307，節次：2

※ 考生請注意：本試題 ☑可 □不可 使用計算機

(1) (25%) The signboard truss is designed to support a horizontal windload of 4 kN. A separate analysis shows that $\frac{5}{8}$ of this force is transmitted to the center connection at C and the rest is equally divided between D and B. Calculate the forces in members BE and BC.
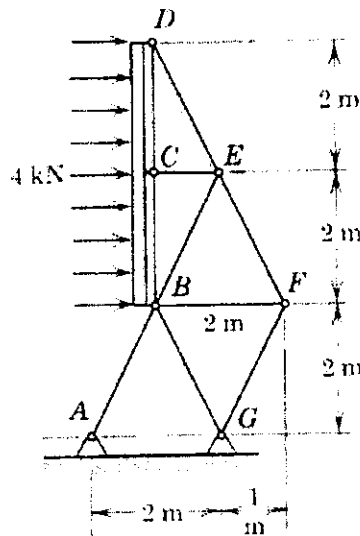

Fig. 1

(2) (25%) Determine completely the resultant force R exerted on the cylindrical dam surface by the water. The density of fresh water is 1,000 Mg/m^3, and the dam has a length b, normal to the paper, of 30 m.

Fig. 2
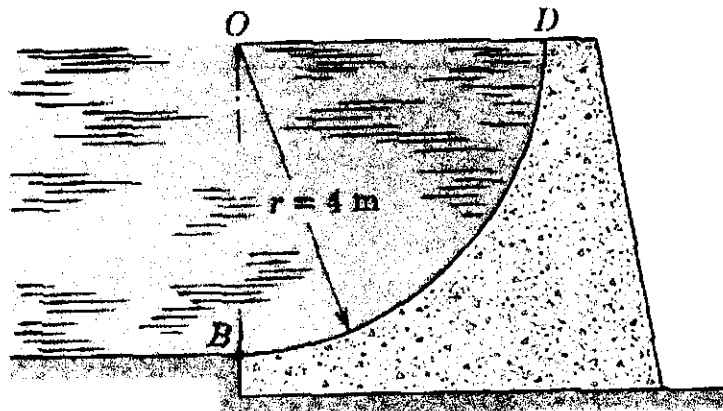
（背面仍有題目,請繼續作答）

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(3) (25%) In the four-bar linkage shown, control link **OA** has a counterclockwise angular velocity $\omega_0 = 10$ rad/s during a short interval of motion. When link **CB** passes the vertical position shown, point A has coordinates $x = -60$ mm and $y = 80$ mm. By means of vector algebra determine the angular velocities of **AB** and **BC**. Calculate the angular acceleration of link **AB** for this position.
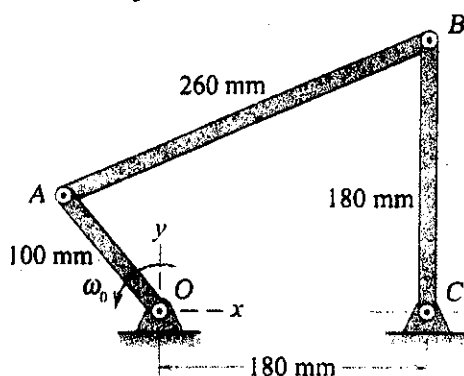
(4) (25%) The homogeneous sphere of mass m and radius r is projected along the incline of angel θ with an initial speed v_0 and no angular velocity ($\omega_0 = 0$). If the coefficient of kinetic friction is μ_k, determine the time duration t of the period of slipping. In addition, state the velocity v of the mass center G and the angular velocity ω at the end of the period of slipping.