淡江大學 95 學年度轉學生招生考試試題

系別：航空太空工程學系三年級　　科目：工程力學(含靜力學、動力學)

准帶項目請打「V」	
V	簡單型計算機

本試題共 2 頁

本試題雙面印製

1. A rigid horizontal bar is supported by a hinge at A and by two steel cables BD and CE, which are of equal length $L = 0.8$ m, cross-sectional area $A = 140$ mm^2, and $E = 200$ GPa. Please calculate the stress in each cable due to a force of 40 kN, applied as shown in Figure 1. (20%)

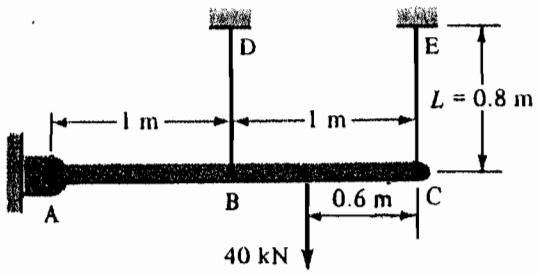

Figure 1

2. Please determine the reactions $R_{Ax}, R_{Ay}, R_{By}, R_{Ey}$ and R_{Fy} of the cantilever structure as shown in Figure 2. (20%)

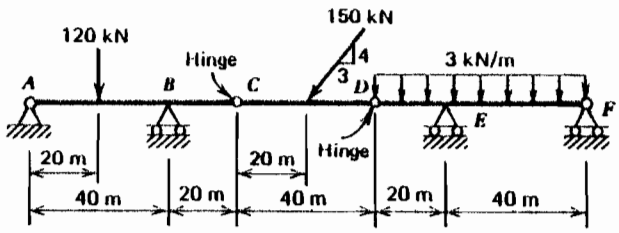

Figure 2

3. Please draw the shear and moment diagrams for the beam shown in Figure 3. (20%)

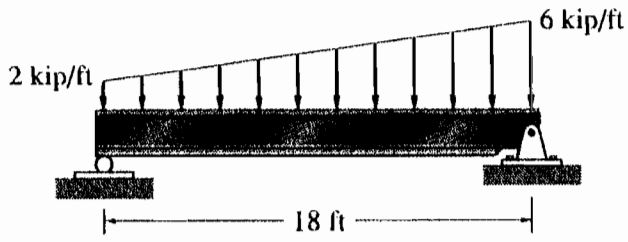

Figure 3

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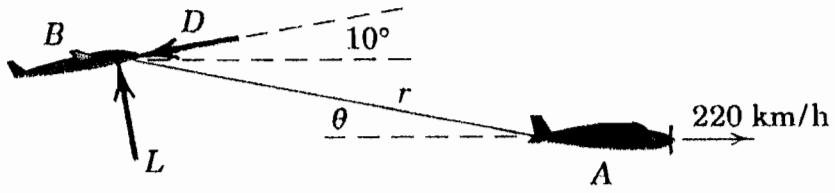
4. The 200-kg glider B is being towed by airplane A, which is flying horizontally with a constant speed of 220 km/h. The tow cable has a length $r = 60$ m and may be assumed to form a straight line. The glider is gaining altitude and when θ reaches 15°, the angle is increasing at the constant rate $\dot{\theta} = 5$ deg/s. At the same time the tension in the tow cable is 1520 N for this position. Please calculate the aerodynamic lift L and drag D acting on the glider. (20%)



5. The 1.2 kg slider is released from rest in position A and slides without friction along the vertical plane guide shown. Please determine (a) the speed v_B of the slider as it passes position B and (b) the maximum deflection δ of the spring. (20%)