淡江大學 95 學年度轉學生招生考試試題

47-1

系別：機械與機電工程學系三年級　　科目：工程力學(含靜力學、動力學、材料力學)

准帶項目請打「V」
V	簡單型計算機

本試題共 2 頁 -1

1. The link shown in Fig. 1 is pin-connected at A and rests against a smooth support at B. Compute the horizontal and vertical components of reaction at the pin A. (20%)

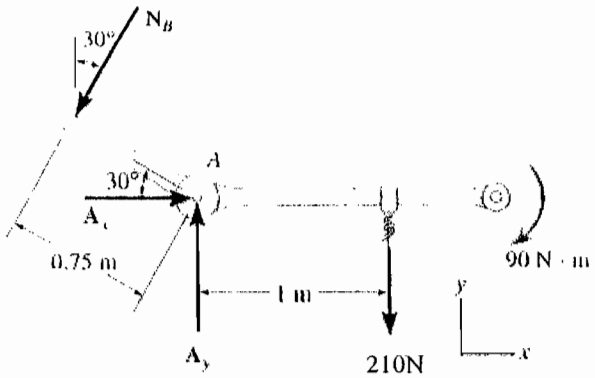

Figure 1

2. The *2 kg* disk shown in Fig. 2 rests on a smooth horizontal surface and is attached to an elastic cord that has a stiffness $k = 20N/m$ and is initially un-stretched. The disk is given a velocity $v_1 = 3m$, perpendicular to the cord, determine the rate at which the cord is being stretched and the speed of the disk at the instant the cord is stretched $0.2m$. (20%)

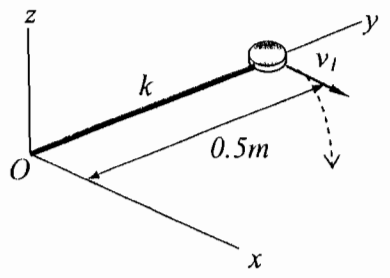

Figure 2

3. The slender rod of mass m in Fig. 3 is released from rest in the horizontal position shown. At that instant, determine the bar's angular acceleration and the force exerted on the bar by the support A. (20%)

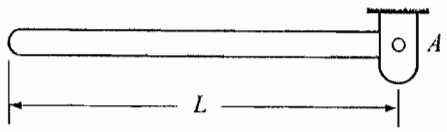

Figure 3

4. A cantilever beam AB with a uniform load of intensity q acting on the right-hand half of the beam is shown in Fig. 4. Determine the deflection δ_B and angle of rotation θ_B at the free end. (20%)
(Note: The beam has constant flexural rigidity EI)

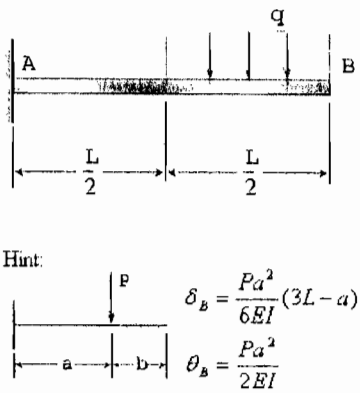

Figure 4

本試題雙面印製

淡江大學 95 學年度轉學生招生考試試題

47-2

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准帶項目請打「V」	
✓	簡單型計算機

5. A rectangular steel plate with thickness $t = 0.25in$ is subjected to uniform normal stresses σ_x and σ_y, as shown in Fig. 5. Strain gages A and B, oriented in the x and y directions, respectively, are attached to the plate. The gage readings give normal strains $\varepsilon_x = 0.0010$ (elongation) and $\varepsilon_y = -0.00007$ (shortening). Knowing that $E = 30 \times 10^6 psi$ and $\nu = 0.3$, determine the stresses σ_x and σ_y and the change Δt in the thickness of the plate. (20%)
Hint: $\varepsilon_x = (\sigma_x - \nu\sigma_y)/E$, $\varepsilon_y = (\sigma_y - \nu\sigma_x)/E$

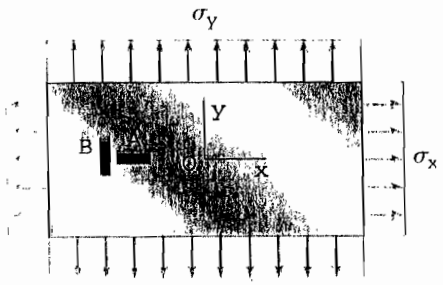

Figure 5