

國立屏東科技大學 九十三 學年度 碩士班暨碩士在職專班 招生考試
車輛工程系碩士班 乙組
專業科目（二）動力學與材料力學 試題

1. A car travels around a horizontal circular track that has a radius of 90 m . If the car increases its speed at a constant rate of 2.1 m/s^2 , starting from rest, determine the time needed for it reach an acceleration of 2.4 m/s^2 . What is its speed at this instant? (25%)
2. The 10-kg rod shown in Fig. 1 is constrained so that its ends move along the grooved slots. The rod is initially at rest when $\theta = 0^\circ$. If the slider block at B is acted upon by a horizontal force $P=50\text{ N}$, determine the angular velocity of the rod at the instant $\theta = 45^\circ$. Neglect friction and mass of blocks A and B. (25%)
3. Determine the angle of rotation θ_B and the deflection δ_B at the free end for a cantilever beam AB subjected to a uniform load of intensity q , as shown in Fig. 2. The beam has length L and constant flexural rigidity EI . (25%)
4. A sign of dimensions $2.0\text{ m} \times 1.2\text{ m}$ is supported by a solid circular pole having diameter 220 mm , as shown in Fig. 3. The sign is offset 0.5 m from the centerline of the pole and its lower edge is 6 m above the ground. Determine the principal stresses at the point B due to a wind pressure of 2000 Pa against the sign. (25%)

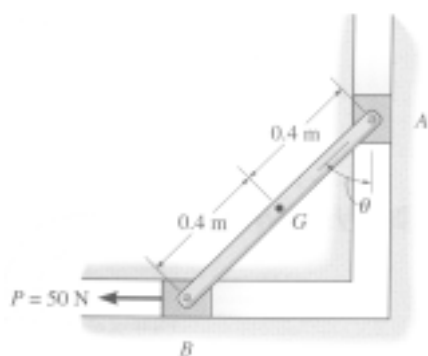


Fig. 1

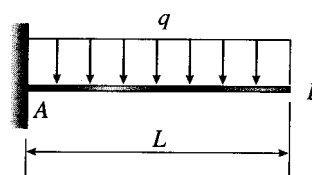


Fig. 2

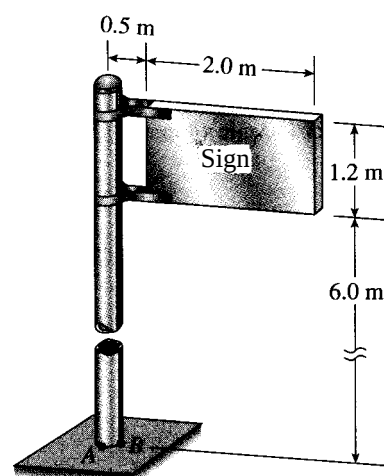


Fig.3

