

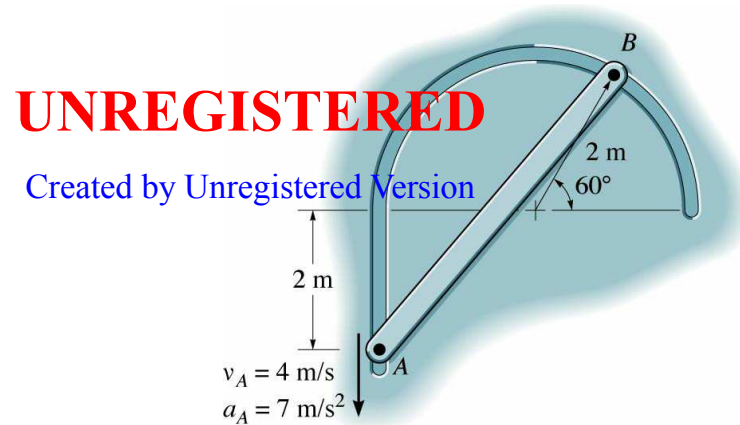
動力學

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Problem 1 (20%)

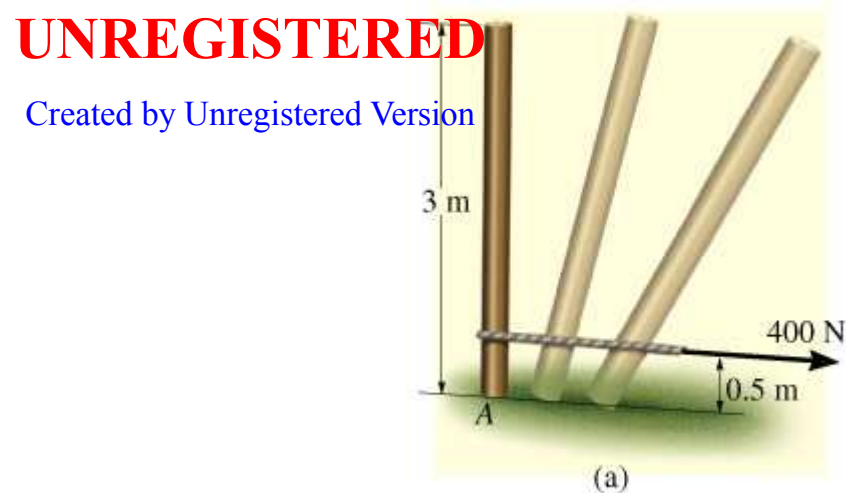
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The ends of the bar AB are confined to move along the paths shown. At a given instant, A has velocity $v_A = 4 \text{ m/s}$ and acceleration $a_A = 7 \text{ m/s}^2$. Determine the angular velocity and angular acceleration of AB at this instant.



Problem 2 (20%)

The uniform slender pole shown in Fig.(a) has a mass of 100 kg and a moment of inertia $I_G = 75 \text{ kg} \cdot \text{m}^2$. If the coefficients of static and kinetic friction between the end of the pole and the surface are $\mu_s = 0.3$ and $\mu_k = 0.25$, respectively, determine the pole's angular acceleration at the instant the 400-N horizontal force is applied. The pole is originally at rest.



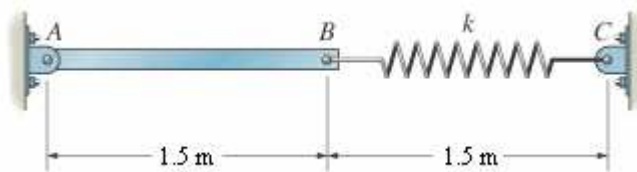
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Problem 3 (20%)

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When the slender 10-kg bar AB of mass M is horizontal it is at rest and the spring is un-stretched. Determine the stiffness k of the spring so that the motion of the bar is momentarily stopped when it has rotated downward 90° .

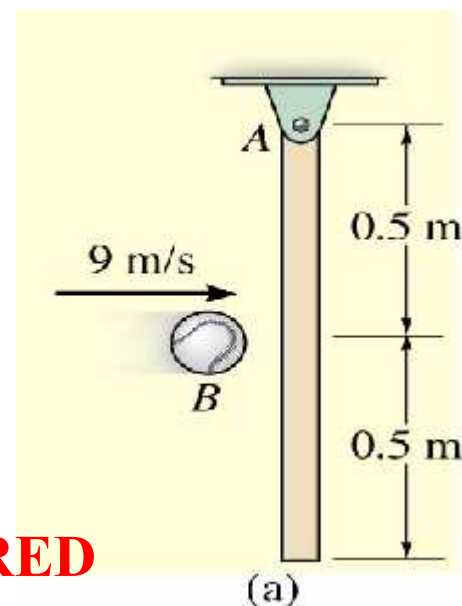


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Problem 4 (20%)

The 5-kg slender rod is suspended from the pin at A , Fig.(a). If a 1 kg ball B is thrown at the rod and strikes its center with a horizontal velocity of 9 m/s, determine the angular velocity of the rod just after impact. The coefficient of restitution is $e = 0.4$.



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Problem 5 (20%)

請解釋「質量」這個概念？