أجب على جميع الأسئلة – الامتحان في صفحتين

1] Train A travels with a constant speed $v_A = 120$ km/h along the straight and level track. The driver of car B, anticipating the railway grade crossing C, decreases the car speed of 90 km/h at the rate of 3 m/sec². Determine the velocity and acceleration of the train relative to the car.   [20 degree]
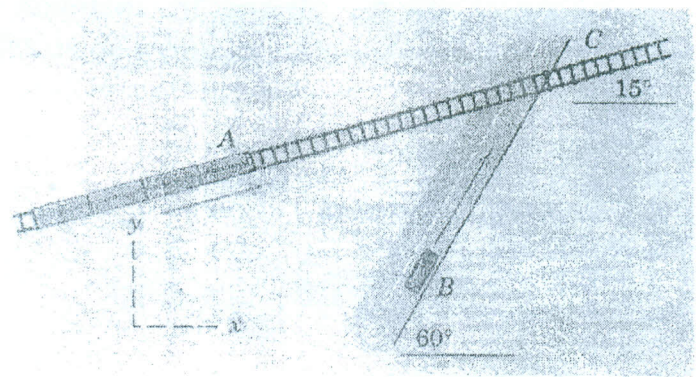
2] The 10-kg slider A moves with negligible friction up the inclined guide. The attached spring has a stiffness of 60 N/m and is stretched 0.6 m in position A, where the slider is released from rest. The 250-N force is constant and the pulley offers negligible resistance to the motion of the cord. Calculate the velocity v of the slider as it passes point C.   [20 degree]

3] The two identical steel balls moving with initial velocities v_A and v_B collide as shown. If the coefficient of restitution is $e = 0.7$, determine the velocity of each ball just after impact and the percentage loss n of system kinetic energy.   [20 degree]
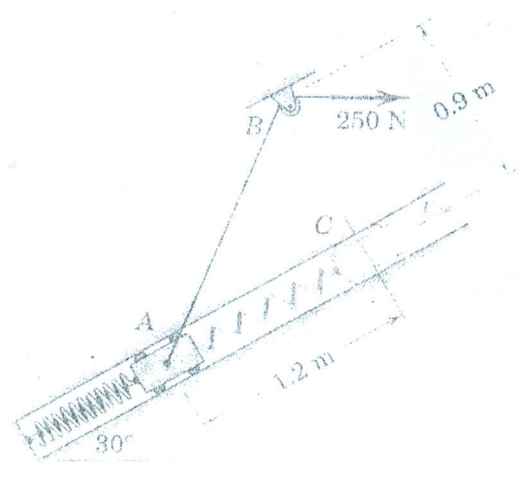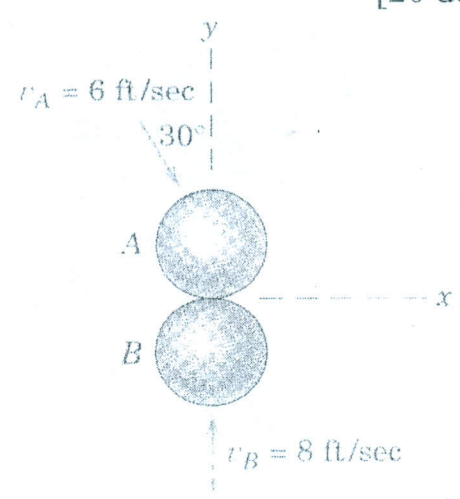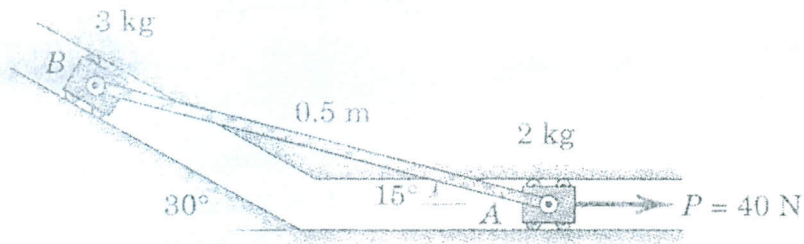

Prob. (2)   Prob. (3)

باقي الأسئلة في الصفحة التالية

4] The sliders A and B are connected by a light rigid bar and move with negligible friction in the slots, both of which lie in a horizontal plane. For the position shown, the velocity of A is 0.4 m/sec to the right. Determine the acceleration of each slider and the force in the bar at this instant. [20 degree]

3 kg

B

0.5 m

2 kg

30°   15° A $P = 40$ N

5] Determine the moment of inertia of the mallet about the x-axis and the corresponding radius of gyration . The density of the wooden handle is 800 kg/m³ and that of the soft-metal head is 9000 kg/m³. The longitudinal axis of the cylindrical head is normal to the x-axis. State any assumptions. [20 degree]

40 mm

50 mm

50 mm

300 mm

30 mm
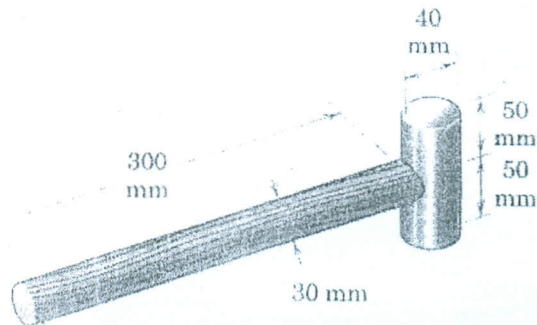
6] The crank OA revolves clockwise with a constant angular velocity of 10 rad/sec within a limited arc of its motion. For the position $\theta = 30°$ determine the angular velocity of the slotted link CB and the acceleration of A as measured relative to the slot in CB. [20 degree]

B A

2θ θ C

300 mm

مع أطيب الأمنيات بالنجاح والتوفيق ...