

# 淡江大學 100 學年度碩士班招生考試試題

64-1

系別：航空太空工程學系

科目：動力學

考試日期：2月28日(星期一) 第4節

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1. Frame  $F$  is a fixed ring gear with internal teeth (not shown in *Figure 1*) that mesh with those of planetary gear  $B_1$ . The teeth of  $B_1$  also mesh with those of the sun gear  $B_3$ , which is pinned at its center point  $O$  to frame  $F$ . The crank arm  $B_2$  is pinned at its ends to  $O$  and to the center point  $P$  of  $B_1$ . The arm  $B_2$  has angular speed  $\omega_2(t)$  counterclockwise. Find the angular velocity of  $B_3$  in terms of  $R$ ,  $r$ , and  $\omega_2$ . (25%)

本試題雙面印刷

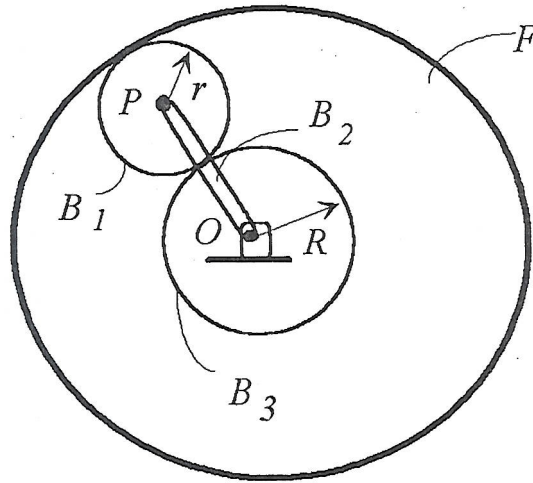


Figure 1.

2. A uniform rod is supported by two cords as shown in *Figure 2*. If the right-hand cord suddenly breaks, determine the initial tension in the left cord  $AD$ . ("initial" means before the rod has had time to move and before it has had time to generate any velocity). (25%)

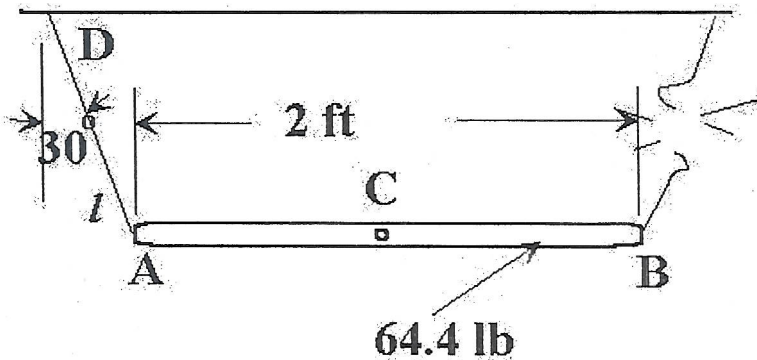


Figure 2.

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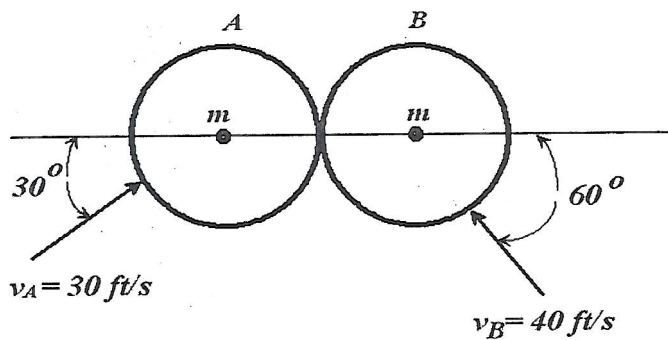
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3. The magnitude and direction of the velocities of two identical frictionless balls before they strike each other are as shown in *Figure 3*. Assuming the coefficient of restitution ( $e$ ) = 0.90, determine the magnitude and direction of the velocity of each ball after the impact. (25%)



4. Calculate the kinetic energy of a rolling body  $B$  having mass  $m$ , radius  $R$ , and radius of gyration  $k_C$  with respect to the  $z_C$  axis. The mass center  $C$  as shown in *Figure 4*, lies at the geometric center. (25%)

