

國立中央大學101學年度碩士班考試入學試題卷

所別：機械工程學系碩士班 甲組(固力與設計)(一般生) 科目：動力學 共 2 頁 第 1 頁
機械工程學系碩士班 丁組(系統)(一般生)
機械工程學系光機電工程碩士班 甲組(機電系統控制)(一般生)

本科考試可使用計算器，廠牌、功能不拘

*請在試卷答案卷(卡)內作答

1. (25%) The wheel consists of a 4-kg rim of 250-mm radius with hub and spokes of negligible mass. The wheel is mounted on the 3-kg yoke OA with mass center at G and with a radius of gyration about O of 350 mm. If the assembly is released from rest in the horizontal position shown and if the wheel rolls on the circular surface without slipping, compute the velocity of point A when it reaches A' .

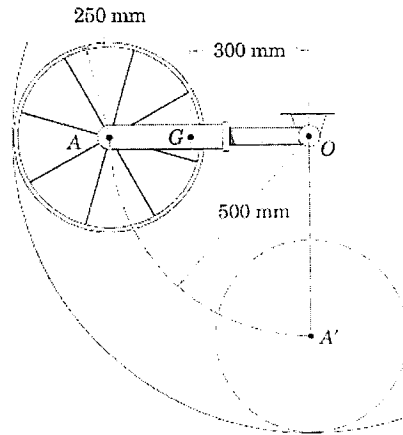


Figure 1

2. (25%) The sphere of mass m falls and strikes the triangular block with a vertical velocity v . If the block rests on a smooth surface and has a mass $3m$, determine its velocity just after the collision. The coefficient of restitution is e .

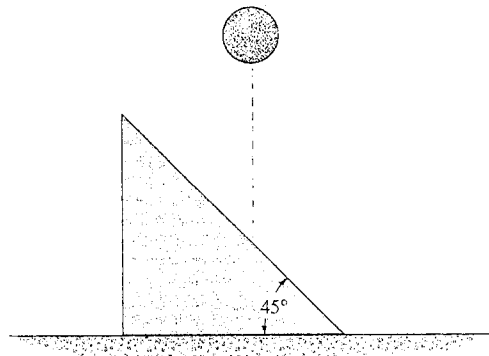


Figure 2

注意：背面有試題

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3. (25%) A simplified clam-shell bucket for a dredge is shown in the Fig. 3. The cable opening and closing the bucket passes through the block at O. IF O is fixed; please determine the angular velocity ω of the bucket and ω_{OB} of the link OB when the bucket jaws are closing. (points will be given if velocity diagram is given)

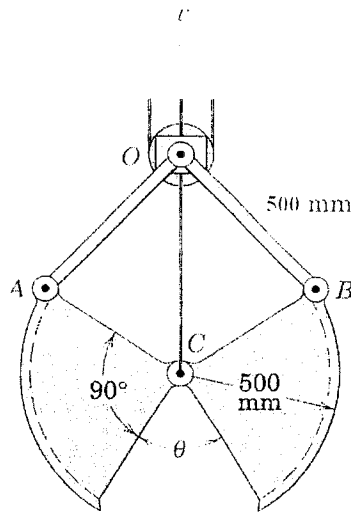


Figure 3

4. (25%) The mass m is supported by a spring k and damper c as shown. Please neglect gravity.
- (6%) Determine the displacement of the point A as a function of time t , if the mass moves with a constant velocity u to the right.
 - (7%) Determine the equation of motion of the mass m .
 - (12%) For $m = 100\text{kg}$, $k = 80\text{N/mm}$, $c = 2\text{Ns/mm}$, $u = 20\text{mm/s}$, $L = 100\text{mm}$ and $\delta = 10\text{mm}$, find the undamped natural frequency and the damping ratio of the system.

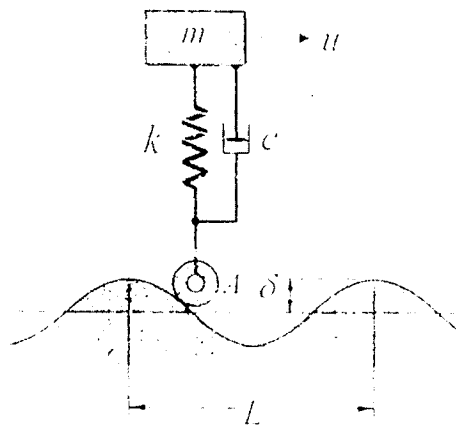


Figure 4

注意：背面有試題