

國立中正大學

113 學年度碩士班招生考試

試題

[第 1 節]

科目名稱	動力學
系所組別	機械工程學系-甲組

—作答注意事項—

※作答前請先核對「試題」、「試卷」與「准考證」之系所組別、科目名稱是否相符。

1. 預備鈴響時即可入場，但至考試開始鈴響前，不得翻閱試題，並不得書寫、畫記、作答。
2. 考試開始鈴響時，即可開始作答；考試結束鈴響畢，應即停止作答。
3. 入場後於考試開始 40 分鐘內不得離場。
4. 全部答題均須在試卷（答案卷）作答區內完成。
5. 試卷作答限用藍色或黑色筆（含鉛筆）書寫。
6. 試題須隨試卷繳還。

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本科目共 2 頁 第 1 頁

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1. (25 %) In Figure 1, it is observed that the time for the ball to strike the ground at B is 2.5 s. Determine the speed v_A and angle θ_A at which the ball was thrown. (gravitational acceleration: $g = 9.81 \text{ kg/m}^3$)

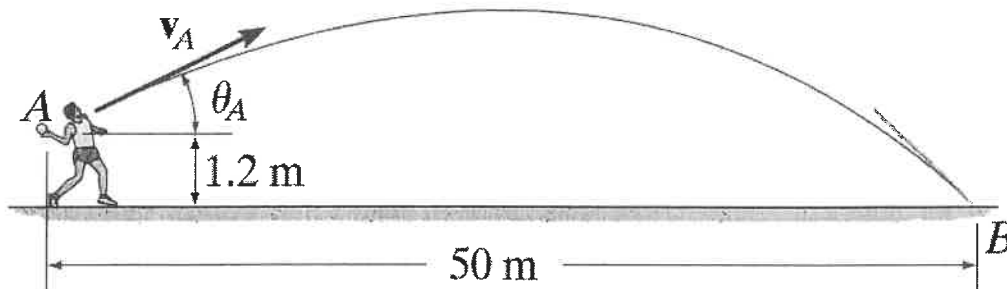


Figure 1

2. (25 %) In Figure 2, the motor lifts the 50 kg crate with an acceleration of 6 m/s^2 . (Notice the weight of cable can be neglected, and the gravitational acceleration: $g = 9.81 \text{ kg/m}^3$)
- (a) Determine the tension T throughout entire cable. (10 %)
- (b) Determine the components of force reaction and the couple moment at the fixed support A . (15 %)

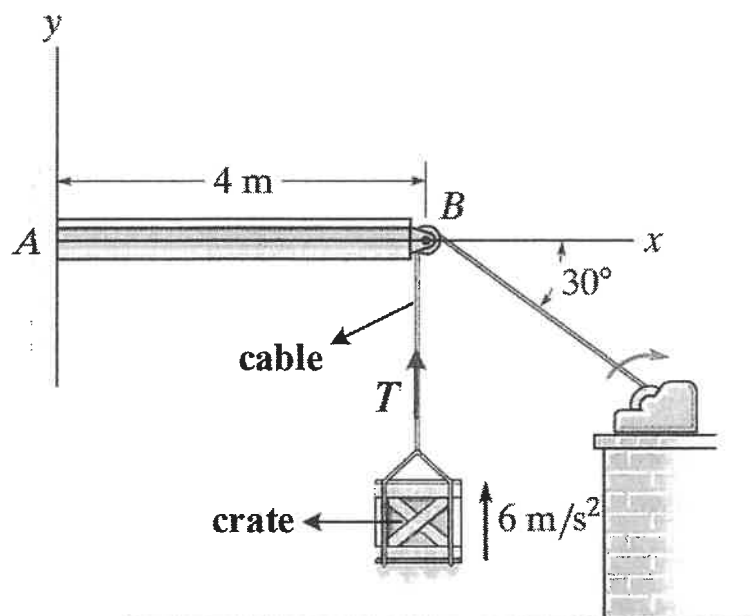


Figure 2

3. (25%) The link is shown in Figure 3. The link OA has a clockwise angular velocity $\omega = 2 \text{ rad/s}$ at the instant shown. Please find

- (a) the velocity of point A. (5%)
- (b) the angular velocity of link AB. (10%)
- (c) the velocity of point B. (10%)

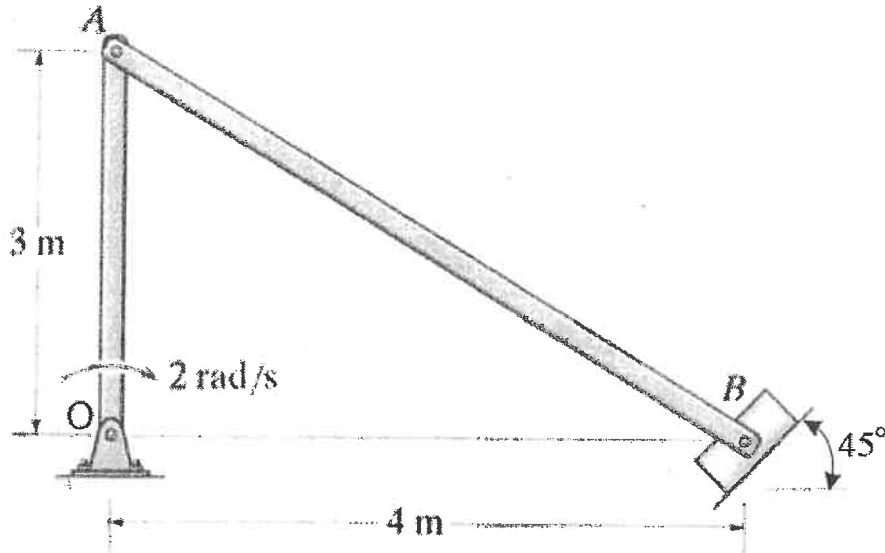


Figure 3

4. (25%) The 700-kg pipe is suspended from one tine of a forklift. It is undergoing a swinging motion such that when $\theta = 30^\circ$ it is momentarily at rest. Determine the normal and frictional forces acting on the tine which are needed to support the pipe at the instant $\theta = 0^\circ$. Measurements of the pipe and the suspender are shown in Figure 4. Neglect the mass of the suspender and the thickness of the pipe.

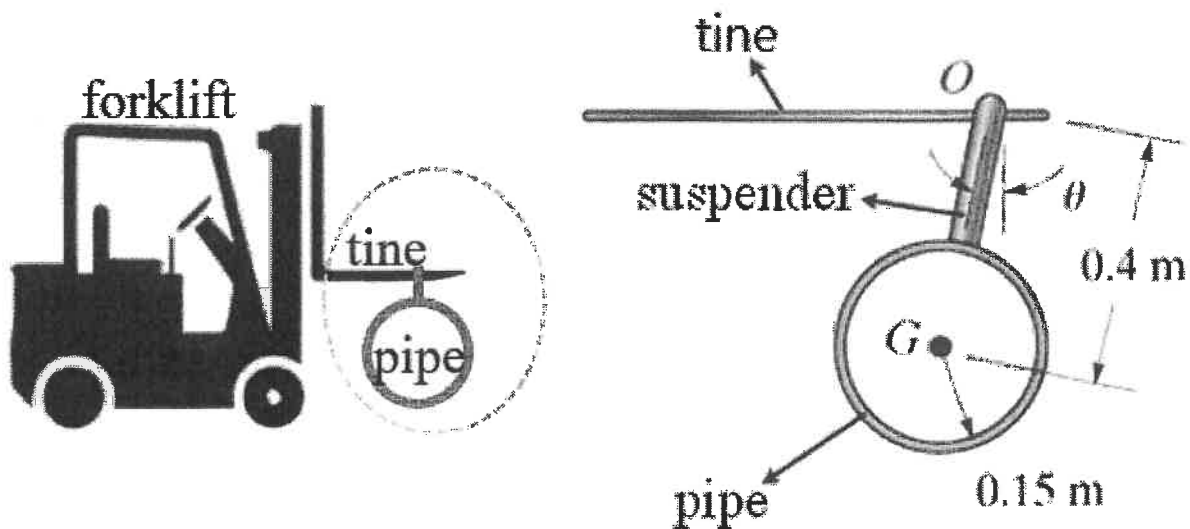


Figure 4