

淡江大學九十二學年度碩士班招生考試試題

系別：機械與機電工程學系

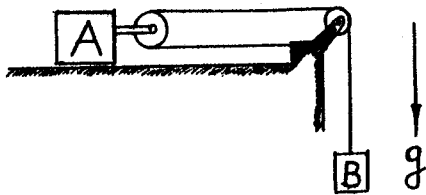
科目：動力學

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| 准帶項目請打「○」否則打「×」 |
| 簡單型計算機 |
| ○ |

本試題共 / 頁

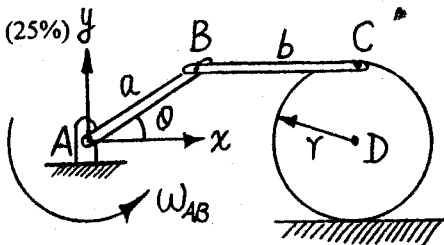
注意事項：1.這份試卷一共有四題，每題都必須回答。
2.重力加速度 $g=9.81\text{m/sec}^2$ 。

一、(25%)



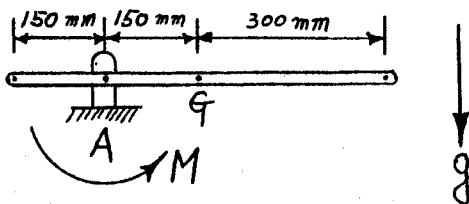
It is known that $m_A=3\text{kg}$ and $m_B=2\text{kg}$. Determine accelerations a_A, a_B of bodies A and B , and tension force T in the string at the instant shown in the figure (Neglect all friction and the mass of the pulleys).

二、(25%)



Link AB has a length $a=400\text{mm}$, and link BC has a length $b=600\text{mm}$. The circular disk has a radius $r=250\text{mm}$ which rolls without sliding on the ground. At the instant shown in the figure, $\theta=30^\circ$ and link AB rotates with an angular speed $\omega_{AB}=0.5\text{rad/sec}$. Determine velocity v_C of joint C , angular velocity ω_{BC} of link BC , and angular velocity ω_{CD} of the circular disk.

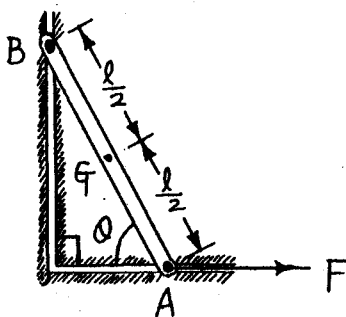
三、(25%)



A moment $M=10\text{N}\cdot\text{m}$ is applied to the uniform slender rod which is initially at rest. The rod has a mass $m=2\text{kg}$ and its center of mass is G .

- 1) Draw free body diagram of this rod.
- 2) By solving equations of motion, obtain:
 - a) Reaction forces R_x and R_y at support A at this instant.
 - b) Angular acceleration α of this rod at this instant.

四、(25%)



A constant force $F=4\text{N}$ is applied to a uniform slender rod which is initially at rest in the $\theta=90^\circ$ position. The rod has a length $l=500\text{mm}$ and a mass $m=0.3\text{kg}$. Center of mass of this rod is at G .

- a) Locate instantaneous center of zero velocity of this rod as it is at the position $\theta=45^\circ$.
- b) Determine angular velocity ω of this rod as it passes through the position for which $\theta=45^\circ$. Neglect the mass of the pins and friction in the system.