87-1

# 淡江大學96學年度碩士班招生考試試題

系別：航空太空工程學系　　科目：動　力　學

| 准帶項目請打「V」 | |
|---|---|
| √ | 簡單型計算機 |

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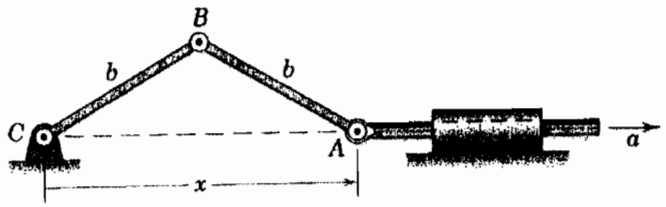
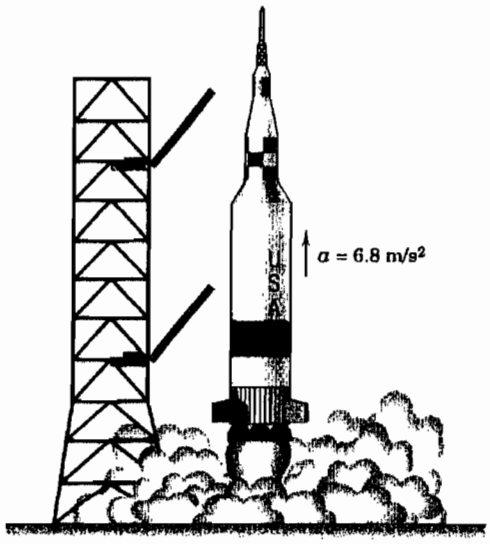
P.1

1 Point $A$ is given a constant acceleration $a$ to the right starting from rest with $x$ essentially zero. Determine the angular velocity $\omega$ of link $AB$ in terms of $x$ and $a$. (20%)




2. At the instant of vertical launch the rocket expels exhaust at the rate of 250 kg/s with an exhaust velocity of 800 m/s If the initial vertical acceleration is 6.8 m/s$^2$, calculate the total mass of the rocket and fuel at launch. (30%)




本試題雙面印製

◀注意背面尚有試題▶

87.V

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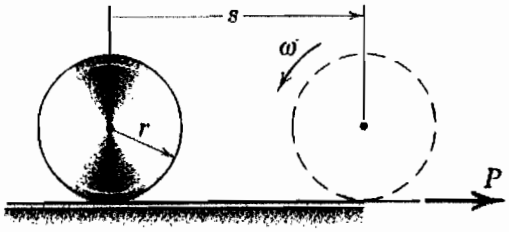
P.2

3 The solid circular cylinder of radius $r$ is at rest on the flat belt when a force $P$ is applied to the belt. If $P$ is sufficient to cause slipping between the belt and the cylinder at all times, determine the time $t$ required for the cylinder to reach the dashed position. Also determine the angular velocity $\omega$ of the cylinder in this same position. The coefficient of friction between the cylinder and the belt is $\mu_k$. (20%)




4. The launch catapult of the aircraft carrier gives the 7200 kg jet airplane a constant acceleration and launches the airplane in a distance of 100 m measured along the angled takeoff ramp. The carrier is moving at a steady speed $v_C = 15$ m/s. If an absolute aircraft speed of 100 m/s is desired for takeoff, determine the net force $F$ supplied by the catapult and the aircraft engines. (30%)