

國立臺北科技大學 113 學年度碩士班招生考試

系所組別：1301 車輛工程系碩士班

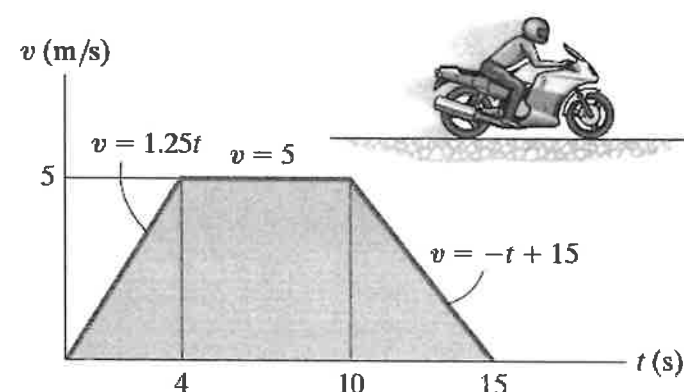
第二節 動力學 試題（選考）

第 1 頁 共 1 頁

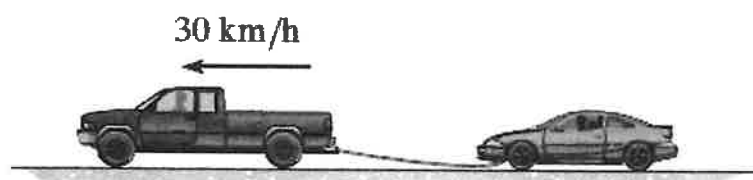
注意事項：

1. 本試題共 4 題，每題 25 分，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

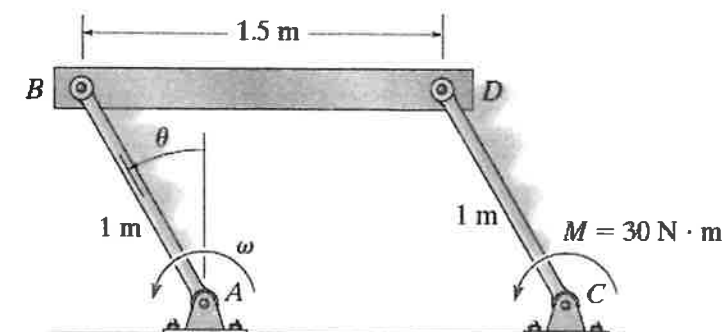
1. A motorcycle starts from rest at $s = 0$ and travels along a straight road with the speed shown by the v - t graph. Determine the total distance the motorcycle travels until it stops when $t = 15$ s. Also plot the a - t and s - t graphs. (25%)



2. The 2.5-Mg pickup truck is towing the 1.5-Mg car using a cable as shown. If the car is initially at rest and the truck is coasting with a velocity of 30 km/h when the cable is slack, determine the common velocity of the truck and the car just after the cable becomes taut. Also, find the loss of energy. (25 %)



3. The linkage consists of two 6-kg rods AB and CD and a 20-kg bar BD. When $\theta = 0^\circ$, rod AB is rotating with an angular velocity $\omega = 2$ rad/s. If rod CD is subjected to a couple moment $M = 30$ N · m, determine ω at the instant $\theta = 45^\circ$. (25%)



4. The hoop (thin ring) has a mass of 5 kg and is released down the inclined plane such that it has a backspin $\omega = 8$ rad/s and its center has a velocity $v_G = 3$ m/s as shown. If the coefficient of kinetic friction between the hoop and the plane is $\mu_k = 0.6$, determine how long the hoop rolls before it stops slipping. (25%)

