國立虎尾科技大學 100 學年度研究所（碩士班）考試入學試題

所別：車輛工程系碩士班
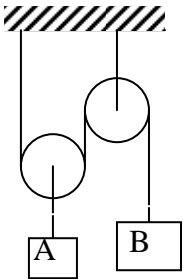科目：考試科目 2 （動力學)

注意事項：
（1）共四大題，每大題廿五分，共一百分。
（2）請於答案卷上註明題號。

1、Determine the acceleration with which block B moves as shown. The masses of blocks A and B are 2Kg and 3Kg respectively and the magnitude of gravitational acceleration is given as 9.81m/s^2. Neglect the masses of the pulleys and cord.

2、The 30-Mg freight car A and 20-Mg freight car B travel towards each other with the velocities shown. If the coefficient of restitution between the bumpers is $e = 0.6$. Determine the velocity of car B just after the collision.

3、The car shown has a mass of 1.2Mg and a center of mass at G. Determine the car's acceleration if the 'driving' wheels in the back are always slipping, whereas the front wheels freely rotate. Neglect the mass of the wheels. The coefficient of kinetic friction between the wheels and the road is $\mu_k = 0.35$ and the magnitude of gravitational acceleration is given as 9.81m/s^2.
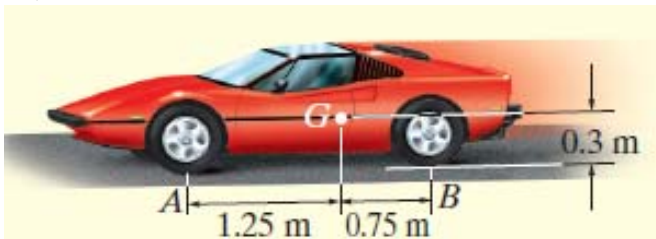
4、The crankshaft AB of an engine turns with a clockwise angular acceleration of 10 rad/s^2. Determine the acceleration of the piston at this instant AB is in the shown. At this instant $\omega_{AB} = 10\,rad/s$ and $\omega_{BC} = 2.43\,rad/s$.

0.75 m

13.6°

ω_{BC} = 2.43 rad/s

B

45°

ω_{AB} = 10 rad/s
α_{AB} = 10 rad/s^2

A

0.25 m

C