請於試卷內之「非選擇題作答區」標明題號依序作答。

1. Draw the shear and moment diagrams for the shaft shown in Figure 1. The support at *A* is a thrust bearing and the support at *C* is a journal bearing. In other words, you can just consider vertical forces and moments at support *A* and *C*. (30%)

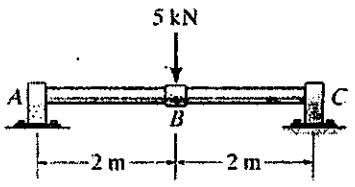

Figure 1

2. In Figure 2, we have a mine car. The total weight of the car is 6 Mg. We say that the center of gravity is at point *G*. If the coefficient of static friction between the wheels and the tracks is $\mu_s = 0.4$ when the wheels are locked, find the normal forces acting on the frontal wheels at *B* and the rear wheels at *A*, when the breaks at *A* and *B* are locked. Will the car be moving? (40%)

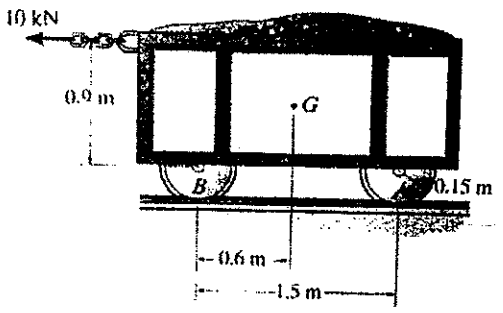

Figure 2

3. In Figure 3, a vehicle of mass *m* is traveling at a velocity v_0, and the vehicle is subjected to the drag resistance of the air. We say that the drag F_D is proportional to the vehicle's velocity *v*, in other words, $F_D = k\,v$, where *k* is a constant. Please determine the distance and the time duration the vehicle will travel before its velocity becomes $0.5v_0$. (30%)

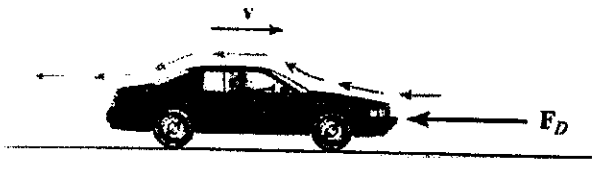

Figure 3

試題隨卷繳回