※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之部份及題號。

1. The vehicle in Fig. 1 is to be towed with two ropes. Determine the magnitude of forces F_A and F_B acting on each rope in order to develop a resultant force of 950 N along the positive x axis, when $\theta = 20^o$ and when $\theta = 50^o$. [35%]
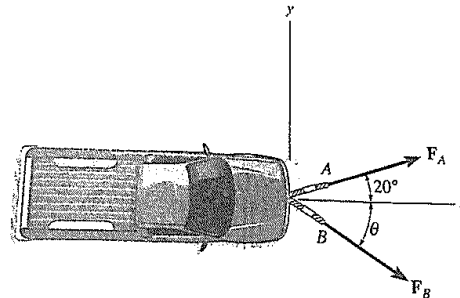

Figure 1.

2. The vehicle in Fig. 2 has a mass of 1.5 Mg and mass center at G. If the front two springs each have a stiffness of $k_A = 58$ kN/m and the rear two springs each have a stiffness of $k_B = 65$ kN/m. Determine their compression when the car is parked on a 30° incline. Additionally, what friction force F_B must be applied to each rear wheel to hold the vehicle in equilibrium? [35%]
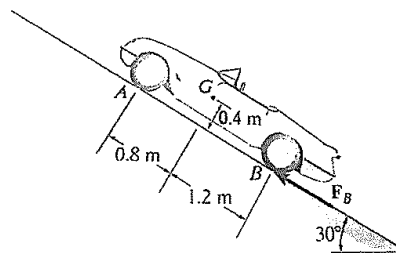

Figure 2.

3. A 3 Mg four-wheel-drive vehicle in Fig. 3 has a center of mass at G. Determine the maximum mass of the log that can be towed. The coefficient of static friction between the log and the ground is $\mu_s = 0.8$, and the coefficient of static friction between the wheels and ground is $\mu_s' = 0.4$. Assume the vehicle is powerful enough to slip. [30%]
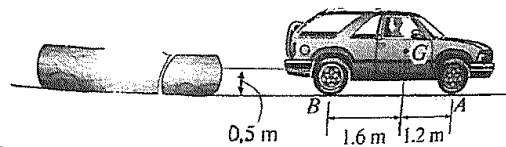

Figure 3.

試題隨卷繳回