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淡江大學九十二學年度碩士班招生考試試題

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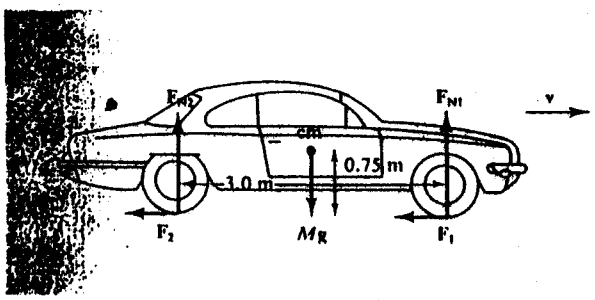
系別：運輸管理學系　　科目：力 學（動力學及靜力學）

准帶項目請打「○」否則打「×」
○ 簡單型計算機

(30%) 1. When the brakes of a car are applied, the force on the front tires is much greater than that of the rear tires. Calculate the magnitude of the friction forces, F_1 and F_2, on the front and rear tires of the car as shown in the figure when the car decelerates at a rate a = 0.50 g. The car has a mass M = 1200 kg, the distance between the front and rear axles is 3.0 m, and its center of mass is midway between axles 75cm above the ground.



(30%) 2. Calculate the power required of a 1400-kg car under the following circumstances: (a) the car climbs a 10 degree hill at a steady 80 km/h; and (b) the car accelerates along a level road from 90 to 110 km/h in 6.0 sec to pass another car. Assume friction retarding force on the car, F_{cr}, is 700N.

(25%) 3. A 1000-kg car rounds a curve on a flat road of radius 50 m at a speed of 50 km/h. Will the car make the turn if (a) the pavement is dry and the coefficient of static friction is 0.80, (b) the pavement is wet and the static friction is 0.20.

(15%) 4. Two automobiles approach a corner at right angles to each other with the same speed of 40 km/h as shown in the figure. What is the relative velocity of one with respect to the other.