國 立 臺 北 科 技 大 學

九十三學年度車輛工程系碩士班碩士在職專班入學考試

甲組：車輛工程 試題

注意事項：

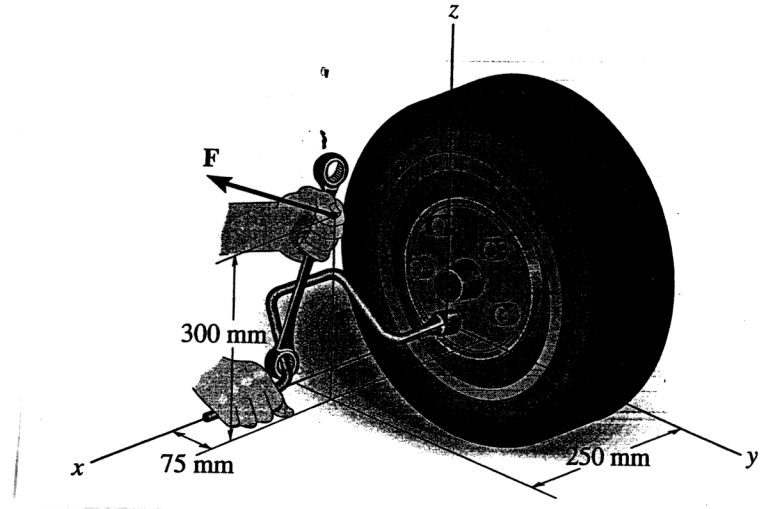1. 本試題共 ▎ 8 ▎ 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。

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1. Determine the maximum weight of the engine that can be supported without exceeding a tension of 450 lb in chain AB and 480 lb in chain AC.(10%)

2. The lug and box wrenches are used in combination to remove the lug nut from the wheel hub. If the applied force on the end of the box wrench is $F = \{4i - 12j + 2k\}$ N, determine the magnitude of the moment of this force about the χ axis which is effective in unscrewing the lug nut. (10%)
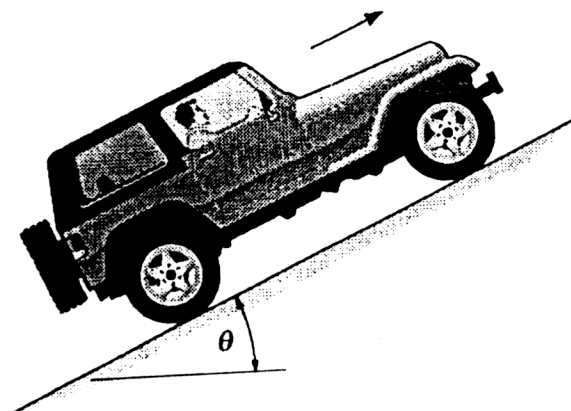

3. The sports car, having a mass of 1700 kg, is traveling horizontally along a 20° banked track which is circular and has a radius of curvature of $\rho = 100$m. If the coefficient of static friction between the tires and the road is $\mu_s = 0.2$, determine the maximum constant speed at which the car can travel without sliding up the slope. Neglect the size of the car. (10%)
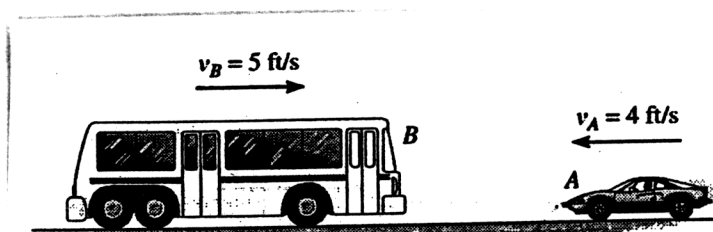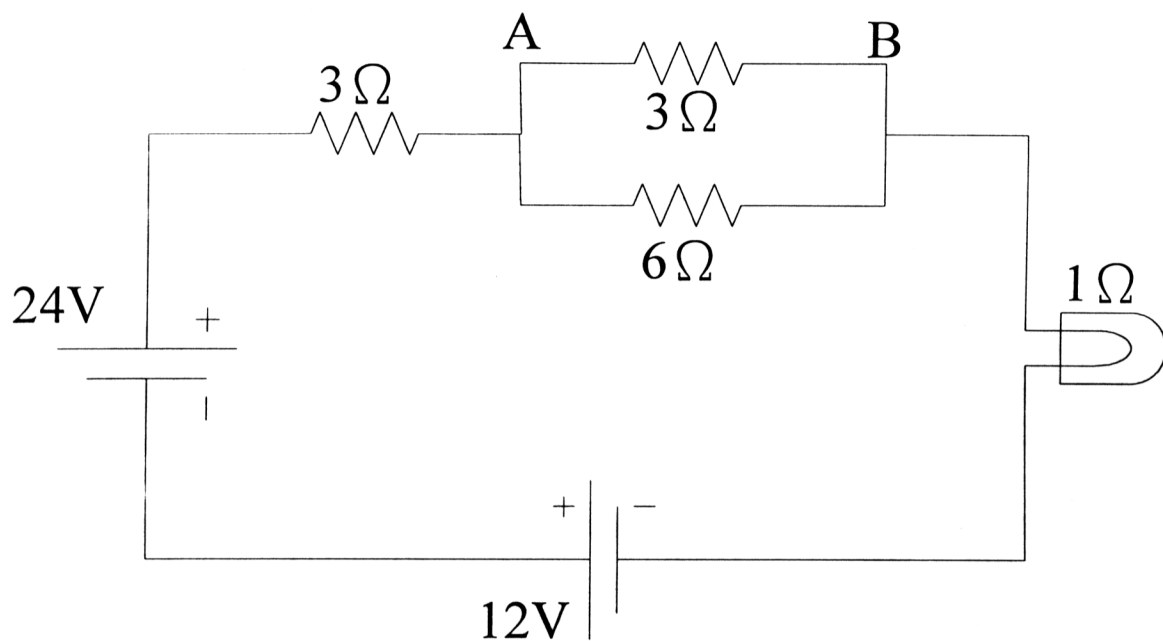
4. The jeep has a weight of 2500lb and an engine which transmits a power of 100 hp to all the wheels. Assuming the wheels do not slip on the ground, determine the angle θ of the largest incline the jeep can climb at a constant speed $\upsilon = 30$ ft/s. (10%)

5. The bus B has a weight of 15000 lb and is traveling to the right at 5 ft/s. Meanwhile a 3000-lb car A is traveling at 4 ft/s to the left. If the vehicles crash head-on and become entangled, determine their common velocity just after the collision. Assume that the vehicles are free to roll during collision. (10%)

6.有一電阻電路如下，試求 AB 端的電壓值？(10%)

A　　　　B

3Ω

3Ω

6Ω

24V　+

1Ω

+　−
12V

7.有一 4 前進檔的車輛，其一檔減速比為 6.85:1，四檔減速比為 1:1，如欲使該車輛的減速比達到最佳化設計時，請問二及三檔的減速比應為多少最適當？(20%)

8.請寫出下列車輛振動種類的英文專有名詞。(4 ×5%)

 a. 車身隨 Z 軸方向平行振動:_____。

 b. 車身繞 Y 軸方向旋轉振動:_____。

 c. 車身繞 X 軸方向旋轉振動:_____。

 d. 車身繞 Z 軸方向旋轉振動:_____。