

國立臺北科技大學  
100 學年度研究所碩士在職專班入學考試

車輛工程系碩士班  
車輛工程與管理試題

填准考證號碼

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**注意事項：**

1. 本試題共【5】題，每題 20 分，配分共 100 分。
2. 請按順序標明題號作答，不必抄題，可用中文或英文作答。
3. 全部答案均須答在試卷答案欄內，否則不予計分。

1. A "coast-down" road test was performed to estimate the aerodynamic resistance coefficient  $C_d$  and the rolling coefficient  $f_r$  of a road vehicle. The test was conducted on a level road. And assume the tail wind could be neglected (i.e. 0 Km/h). The vehicle was first run up to a speed of 97 Km/h and then the gear was shifted to neutral. The vehicle decelerated under the action of the aerodynamic resistance, the rolling resistance of the tires, and the internal resistance of the driveline. The vehicle slowed down from 97 Km/h to 88.5 Km/h in a distance of 160 m and from 80 Km/h to 72.4 Km/h in a distance of 162.6 m. The vehicle weights 15.568 KN and has a frontal area of 2.32 m<sup>2</sup>. Assuming that the rolling resistance of the tires is independent of speed, that the internal resistance of the driveline may be neglected, and that the equivalent mass factor  $\gamma_b$  is 1.0, estimate the values of the aerodynamic resistance coefficient  $C_d$  and the rolling resistance coefficient of the tires  $f_r$ . Make sure to use consistent units in your calculation. (20%)

(Hint:  $R = f_r W + 0.5\rho A C_d V^2$ )

$a = (V_1^2 - V_2^2)/2S$ , and

$\rho = 1.23 \text{ Kg/m}^3$ )

2. Please list the three basic architectures of electric/internal-combustion-engine hybrid vehicles (10%), and do simple schematic plots for these 3 architectures (10%).

3. There are some indicators commonly used to measure the success of a company in general. These indicators are both the performance targets that businesses try to achieve and the basis for measuring actual performance to determine if corrective action is needed. Please list 3 of those indicators (10%) and explain them (10%).
4. Today's businesses operate in a highly competitive global economy, and the level and extend of global focus will continue to grow. Businesses are involved in a variety of global activities. Please list 3 influences that prompt a business to take a global perspective (10%) and explain them (10%).
5. The differential for a rear wheel-driven vehicle is shown schematically. The outside diameter of the wheels is 24 in. Assume that the vehicle is stopped so that the right wheel sits on a small icy patch and can spin freely while the left wheel does not spin. Determine the angular velocity of the right wheel if the angular speed of the drive shaft is 500 rpm. (20%)

