所別：土木工程學系碩士班 運輸工程組(一般生)　　科目：運輸工程　共＿＿／＿＿頁　第＿＿／＿＿頁
　　　土木工程學系碩士班 運輸工程組(在職生)
本科考試可使用計算器，廠牌、功能不拘　　　　　　　　　＊請在試卷答案卷（卡）內作答

Transportation Engineering　　　　　　　　Total score: 100%

Note: You can write your answers in Chinese.　For the first three problems, please write down your calculation procedures instead of answers only.　Note that $g = 32.2$ ft/sec^2 and 1 mile = 5280 feet.

Problem 1 (20%): Suppose that a driver with normal vision can read a sign from a distance of 40 feet for each inch of letter height and that the "design driver" has a 20/40 vision.　Given a perception-reaction time of 1.5 seconds, a coefficient of friction of 0.25, a letter size of 10 inches and downhill on a 2^0 incline, determine how far away from an exit ramp a directional sign should be located to allow a safe reduction of speed from 75 mile/hour to 30 mile/hour.

Problem 2 (15%): In this problem, you are asked to solve the amber duration to prevent dilemma zones in an intersection.　Given an intersection width (w) of 80 feet, a perception-reaction time (δ) of 1.5 seconds, a comfortable deceleration (a^*) of 8 ft/sec^2, and a vehicle length (L) of 21 feet, at what speed (v_0) does the amber duration (τ_{min}) attain a minimum?　What is τ_{min}?

Problem 3 (20%): Assume that a highway follows the following relationship: $u = 60 - 0.2k$, where u is the vehicle speed and k is the density. (u: mile/hour, k: vehicle/mile)
(a) (10%) Please find capacity (q_{max}), speed (u_m) and density (k_m) at capacity. Also find free-flow speed (u_f) and congested density (k_j).
(b) (10%) If the vehicular stream on this highway is traveling at 50 mile/hour and then interrupted by an accident for 10 minutes, please estimate how many stationary vehicles are accumulated in front of the accident at the end of 10 minutes.

Problem 4 (20%): Explain the following terms:
(a) (5%) HOV lane
(b) (5%) peak hour factor
(c) (5%) intermodal transportation
(d) (5%) park-and-ride and kiss-and-ride

Problem 5 (25%): Answer the following questions:
(a) (5%) Please explain what the objective of phasing at an intersection is.
(b) (10%) Please describe the relationship between transportation and land use.
(c) (10%) What are the four conventional steps in the sequential demand-forecasting process? Please show an existed model in each step?

參考用

本科考試可使用計算器，廠牌、功能不拘　　　　　　　　　＊請在試卷答案卷（卡）內作答