所別： 土木工程學系 碩士班 運輸工程組(一般生)
　　　 土木工程學系 碩士班 運輸工程組(在職生)

科目： 運輸工程

本科考試可使用計算器，廠牌、功能不拘　　　　　*請在答案卷(卡)內作答

一、試解釋下列名詞：（1）trip generation；（2）common carriers；（3）HOV；
　　（4）signal coordination；（5）PHF；（6）ITS。（每小題5分）

二、Given that high speed rail and commercial aircraft are two main passenger transportation modes available for long-distance trips in a city. Typical travel-time components for these two modes are listed as follows:

High speed rail	
Access origin station	20 min
Wait for train and board	15 min
...station-to-station main haul...	
Leave train and walk to exit from station	5 min
Access destination point	20 min

Commercial aircraft	
Access origin terminal	30 min
Check-in, walk to gate, and wait	30 min
Board and time until plane leaves gate	15 min
Taxiing and stops until takeoff	10 min
...terminal-to- terminal main haul...	
Landing and taxiing to gate	5 min
Permit to open doors, exit, and walk to baggage claim	10 min
Wait for luggage	15 min
Walk to exit terminal	5 min
Access destination point	30 min

In terms of travel time, for which trip distance is the high speed rail more competitive? Assuming a speed of 300 km/h for high speed rail, and 600 km/h for commercial aircraft. （20分）

三、已知舒適煞車減速度為3.2 m/s^2，路口寬20 m，反應時間1.5 sec，且車長為5 m。
　　試問：（1）車行速率為多少時，號誌黃燈時間可達到最小？（10分）（2）此最小黃燈時間為多少秒？（5分）

注意：背面有試題

四、某城市舉辦元宵大型燈會，預計元宵節當晚 4 小時期間人潮將達到高峰，總計將有 20,000 人次進場觀賞。為不造成周邊道路交通的阻塞，必須採用遊園車進行接駁服務。經評估結果，預計將有 60%的遊客由附近的捷運車站搭乘接駁遊園車進場觀賞。已知每一接駁班次之來回時間（round-trip time）為 15 分鐘且每一接駁遊園車之座位數為 20 位，試問：（1）在無站位之高服務水準之下，必須準備多少輛遊園車方能滿足此接駁需求？（5 分）（2）若參觀民眾願意站立搭乘，使每一班次之乘載人數達到 50 人，則可減少使用幾輛接駁遊園車？（5 分）
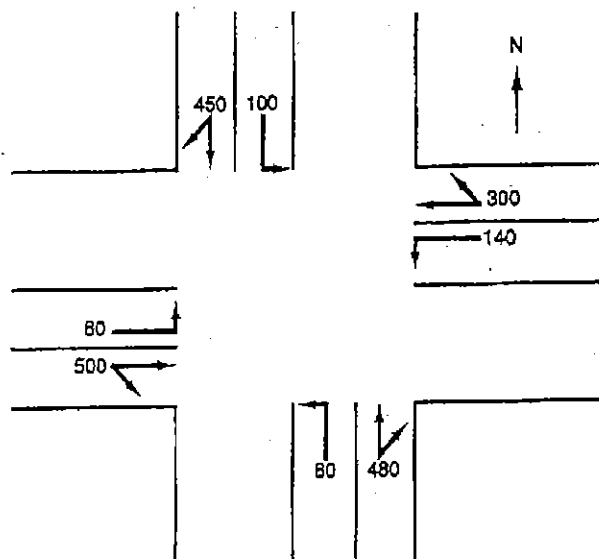
五、A 2.2 m wide truck with a center of gravity at a height of 1.5 m above the pavement is traveling on a circular path of radius R = 200 m and superelevation $e = 0.04$. Determine the maximum safe speed to avoid both slipping and overturning, assuming that the coefficient of side friction is 0.3.（10分）

六、Using the Webster's formula $C_o = \dfrac{1.5L+5}{1-CS}$, estimate the optimal cycle length for the intersection shown in the following figure. Assume that phase A serves the north-south traffic and phase B serves the east-west traffic. Lost time is equal to 4 s per phase and yellow plus all red time is equal to 5 s. The prevailing saturation flows are as follows:

s = 1,750 for through plus right turn traffic

s = 320 for left turn traffic

which reflects a permitted operation.（15分）

注意：背面有試題