

系所組別： 土木工程學系丙組

考試科目： 運輸工程

考試日期： 0307，第次： 2

※ 考生請注意：本試題 可 不可 使用計算機

一. Level of Service

1. Translate the following paragraph into Chinese (10%)

“Although traffic volume is the principal factor affecting the level of service of a highway segment, factors such as lane width, lateral obstruction, traffic composition, grade, and speed also have some effect since the maximum flow on a given highway segment depends on each of these factors.”

2. Traffic flow at level of service E is unstable. The average spacing between consecutive vehicles decreases to 80 ft. Density increases to 67 pc/mi/ln. When operating conditions are at level of service E, the freeway segment is operating at or near capacity. Average speeds at capacity are approximately 30 mph.

a. Explain 67 pc/mi/ln (5%)

b. Estimate the capacity of the described freeway segment. (5%)

c. Accordingly, what is the v/c for level of service E? (5%)

二. Geometry Design

1. The balance superelevation for the standard gauge railway is $c = 11.8 \frac{v^2}{R}$, where c : balance superelevation (mm), v : train speed (kph), R : curve radius (m), and wheel base=1500mm. Please calculate the design speed with the following design parameters. (10%)

Design superelevation=180mm; superelevation deficiency=60mm,

Minimum radius of curve=6250m

2. State the three factors considered in determining lengths of horizontal transition curves in railway design. (5%)

3. State the three factors considered in determining lengths of horizontal transition curves in highway design. (5%)

4. Use the following hint to explain the advantage of clothoid curve. (5%)

With a defining property of the clothoid spiral being that curvature varies uniformly along the spiral (rather than the tangent).

(背面仍有題目,請繼續作答)

系所組別： 土木工程學系丙組

考試科目： 運輸工程

考試日期：0307，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

三. Highway Pavements

1. Translate the following paragraph into Chinese (10%)

“Design considerations in all cases include traffic loads, the effects of environmental condition such as temperature and moisture, an evaluation of load-bearing capacity of subgrade material, and availability of materials. Design methods include computerized optimization programs, mechanistic methods based on stress-strain calculations, and empirical methods in which the performance of pavements is predicted from the results of road tests and actual experience.”

2. Explain why the pavements near toll booth area generally use Portland cement concrete. (5%)

3. How does AASHTO pavement design procedure consider the damages to pavements due to combinations of heavy trucks, buses, and passenger cars? (5%)

4. List at least three types of asphalt concrete pavement distress or failure. (5%)

四. Air transport

1. What factors should be considered to adjust runway length after the specified length has been obtained. (10%)

2. A380 has entered commercial aviation since 2007. Please describe the impacts on airport design via the following aspects.

a. Airport capacity (5%)

b. Terminal design (5%)

c. Runway pavements (5%)