

本試題是否可以使用計算機: 可使用, 不可使用 (請命題老師勾選)

所有題目均可以用中文或英文作答。

1. Please derive the balance superelevation, $c = 11.8 \frac{v^2}{R}$, where c : balance superelevation (mm), v : train speed (kph), R : curve radius (m). (20%)
2. Please read the following paragraph and fill in the blank with an appropriate railway terminology (10%), and explain the paragraph. (10%)

Until about 30-40 years ago, tracks were laid in all networks (and are still laid in many networks) by leaving gaps between consecutive rails, and then connecting the rails with _____. The basic purpose of the gaps was to absorb length variations due to temperature fluctuations.

The connection technique was detrimental to rail transportation in several ways:

 - it significantly reduced passenger comfort,
 - it caused considerable wheel and rail fatigue and wear,
3. Highway pavements and railway tracks are designed to protect subgrade from permanent deformations. The strengths of pavements or tracks are hence dependent on bearing capacity of subgrade. Generally, bearing capacity of soil seldom exceeds 20 psi. If your analysis show the subgrade stress about 8 N/cm², would you accept the design? Or you will decide to strengthen the structure? Please explain and show your calculations (10%)
4. Sight distance is a very important feature for any highway. Please explain what sight distance is (10%), and why are there several different types of sight distances. (10%)
5. Clothoid curves are commonly used for highway horizontal alignments. Please write the basic formula for a clothoid curve (15%) and explain why clothoid curves are needed in a horizontal alignment (15%).