所有題目均可以用中文或英文作答。

1. Please derive the overturning speed of a vehicle for curving, $v = 3.6\sqrt{gR\dfrac{2h_e + S}{2h_e - Se}}$. [S: width of the vehicle ; h_e: height of center of gravity ; g : acceleration of gravity; e : superelevation; R: radius of circular curve ; centrifugal force $F = \dfrac{mv^2}{R}$]   (20%)

2. The engineers debated on the pavement type adopted in the long tunnel in Taipei-Ilan expressway. Please write down the advantages and disadvantages of rigid pavement in the long tunnel. (20%)

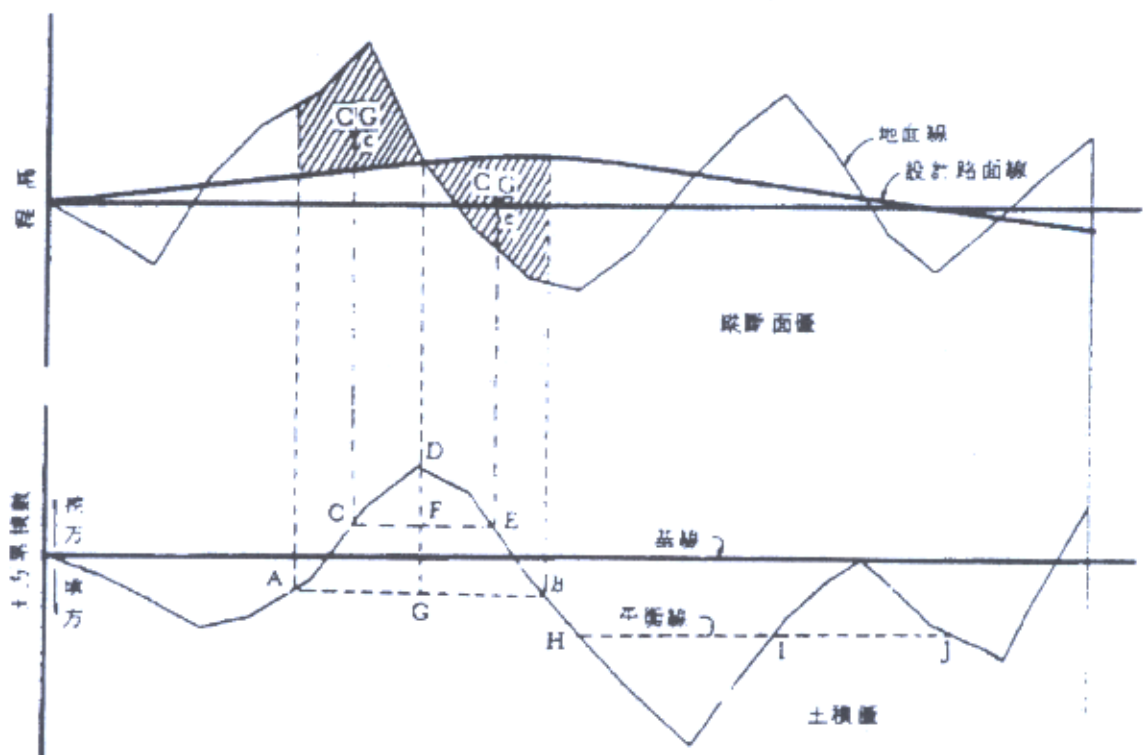3. Please explain the earthwork cumulative figure below (20%)

圖 11.9 縱斷面圖及土積圖

4. What are the differences between the transition curves $y = \dfrac{x^3}{6RL}$ and $y = \dfrac{1}{2R}\left\{\dfrac{x^2}{2} + \dfrac{L^2}{\pi^2}\left[\cos\left(\pi \times \dfrac{x}{L}\right) - 1\right]\right\}$ in railway engineering ? (20%)

5. What data would you need to design appropriate the locations of taxiway exits in an airport ? (20%)

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