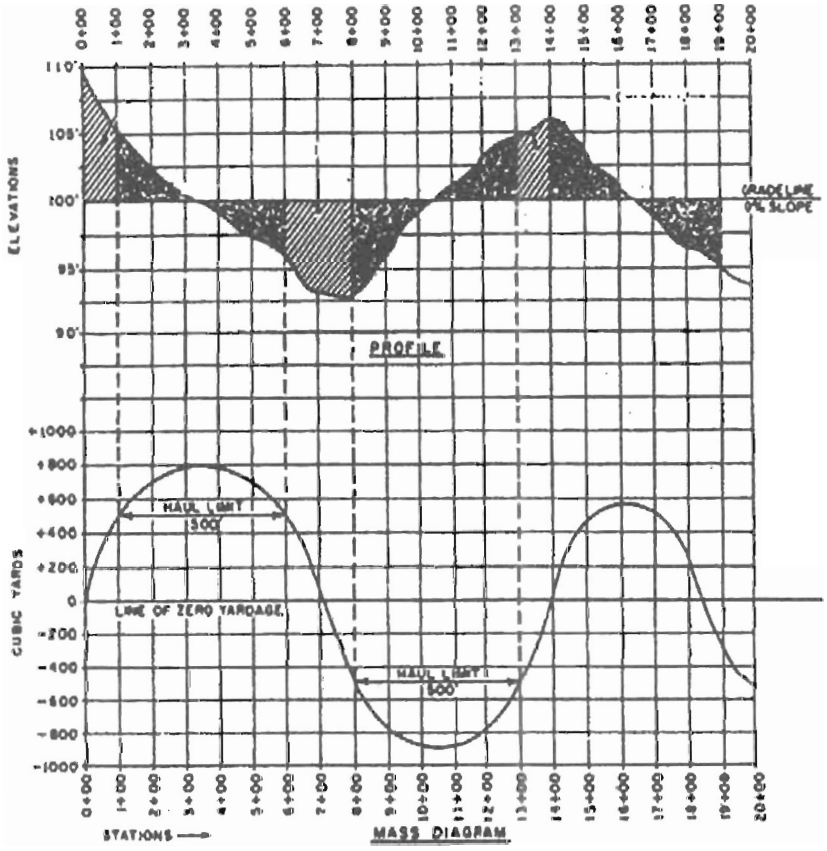
系所組別： 土木工程學系丙組

考試科目： 運輸工程

考試日期：0219，節次：2

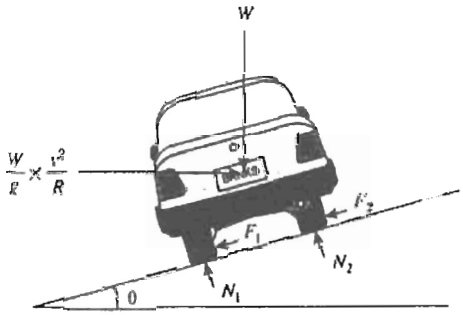
※ 考生請注意：本試題 ☑可 ☐不可 使用計算機

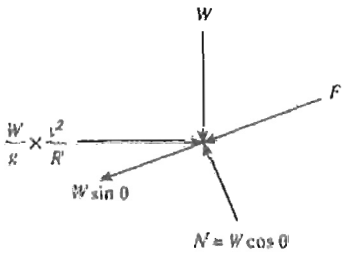
1. Estimate the volume borrowed and wasted (20%)



2. Derive the $R = \dfrac{v^2}{127(e_{max} + f_s)}$ (20%)

where e_{max}=tanθ,
f_s=friction coefficient





3. A wood sleeper, $h \times b \times L = 180mm \times 230mm \times 2600mm$, is tested to have ultimate working stress at 1200psi. The sleeper will be placed on a standard-gauge railway. Please determine the allowable axle load. (20%)
[bending moment at sleeper center= $P(L_1-2L_2)/4$, bending moment at rail seat= PL_2^2/L]
[L_1=spacing of rail centerlines, L_2=distance between rail centerline and sleeper edge]

4. The heavy vehicle adjustment factor f_{HV} was calculated for a rural freeway on a 1.7km long 3.1 percent upgrade with 10% trucks and buses and 8% recreational vehicles.

$$f_{HV} = \frac{1}{1 + 0.10(3.0 - 1) + 0.08(2.0 - 1)} = 0.78$$

What does 0.78 mean to the real traffic volume and equivalent volume? (20%)

5. Please locate the appropriate runway exits of a 10000ft runway for category C and D aircraft with touchdown speed of 100knot and 118knot respectively. [exit speed=15mph, deceleration=5ft/sec^2, touchdown threshold=1500ft] (20%)