



**SCHOOL OF CIVIL ENGINEERING
ENGINEERING CAMPUS
UNIVERSITI SAINS MALAYSIA
14300 NIBONG TEBAL
PULAU PINANG**

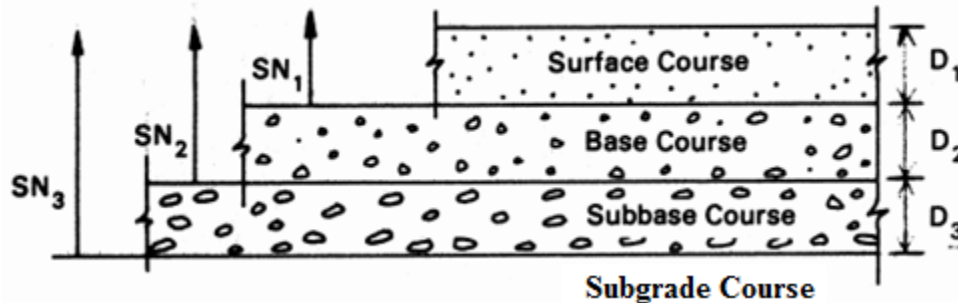
EAL 337 PAVEMENT ENGINEERING

SEMESTER I [SESSION 2021/2022]

ASSIGNMENT 2

Question 1

[a] Based on the given flexible pavement structure below, compute the pavement thickness if a full depth perpetual pavement were to be constructed



$$SN_1 = 2.5; a_1 = 0.40$$

$$SN_2 = 3.7; a_2 = 0.25; m_2 = 0.7$$

$$SN_3 = 4.8; a_3 = 0.15; m_3 = 0.7$$

$$\text{Reliability} = 75\%$$

$$S_o = 0.49$$

$$\Delta\text{PSI} = 2.5$$

$$\text{ESALs} = 20 \times 10^6$$

$$\text{Subgrade } M_R = 9\text{ksi}$$

[12 Marks]

[b] As an engineer of MHA, you are appointed to design a road pavement for a highway with an average daily traffic based on Highway Planning Unit (HPU) survey of 1250 vehicles, with 20% of which are commercial vehicles with un-laden weight > 1.5 tons. The following additional information is available:

Lane distribution factor (L) = 1.0	Subgrade properties:
Terrain factor (T) = 1.0	CBR mean = 18.9%
Design life = 20 years (Urban)	CBR standard deviation = 4.7%
Annual traffic growth = 4.5%	Normal deviate = 1.342

State all other assumptions made.

- i. Determine the traffic category and the subgrade category based on the available information
- ii. Select and explain the chosen pavement structure,

[13 Marks]

Question 2 [20 Marks]

[a] Driving comfort is greatly influenced by the pavement performance. Explain **THREE (3)** factors that affect the performance of the flexible pavement

[6 Marks]

[b]. With the aid of sketches, specify **THREE (3)** types of distress in the flexible pavement, and explain the probable cause for these distresses to manifest.

[9 Marks]