Question 1

Shown below is a load-meter study on axle weight load distribution at a particular highway. The survey involved a total of 1500 trucks. Determine the truck factor for the information given below:

Single axle	
Axle load (klps)	No. of axles
2	1200
6	800
10	120
14	45
18	145
22	20
26	2
Tandem axles	
14	4
18	25
22	85
26	90
30	120
34	90
38	30

Question (2)

Calculate the number of repetitions of the standard axles given the following data:

- Average daily traffic = 20000 vpd
- Directional Distribution = 60/40
- Lane distribution factor = 0.8
- Truck percent = 25%
- Rate of traffic increase = 2.5%
- Design analysis period = 20 years
- Truck factor = 4

Question (3)

A pavement cross section was estimated to comprise the following:-

- The AC course having a thickness of 6 inch and a modulus of elasticity of 250000 psi
- The base course is a crushed stone having a thickness of 12 inch and a CBR value of 80
- The bottom layer is a sandy gravel sub base with a thickness of 16 inch and a CBR value of 30

Evaluate the above pavement section, whether it is under designed or over designed. The actual input parameters needed for design are:-

If you find out that pavement is over designed, estimate how much money you could save for a length of 1 km and a width of 1 lane (3.5 m). If you find out that the pavement is under designed, estimate how much money you need (per 1 km per lane) in order to assure that no failure will occur during the entire pavement life. In estimating the cost, the following unit rate price can be assumed:

- Cost of AC for 1 inch thickness = 12 E.P / m^2
- Cost of Base Course for 1 inch thickness = 2.5 E.P / m^2
- Cost of Sub base Course for 1 inch thickness = 0.75 E.P / m^2