

Q1 :-

$$M_R = 7000 \text{ psi} \quad (\text{From Fig 16-3})$$

$$\text{Asphalt thickness} = 10.1 \text{ inch} \quad (\text{Fig 20.10})$$

$\Rightarrow$  use  $\textcircled{10}$  or  $\textcircled{10.5}$  inch

Q2 :-

$$a_1 = 0.38 \quad (\text{Fig 16-13}) \quad , \quad a_2 = 0.13 \quad (\text{Fig 16-15})$$

$$\text{Min} = D_2 = 6 \text{ inch} \quad (\text{Table 16.8})$$

$$3.2 = a_1 D_1 + a_2 D_2 \quad \Rightarrow \quad D_1 = 6.37 \text{ inch} \quad \begin{matrix} \nearrow \\ \nearrow \end{matrix} \begin{matrix} D_{\text{min}} = 3 \text{ inch} \\ \nearrow \end{matrix}$$

Table 16.8

use  $D_1 = \textcircled{6.5}$  inch

Q 3:-

$$GF = \frac{(1.05)^{20} - 1}{0.05} = 33.066$$

$$DTN = (15)(365)(33.066) = 181.036$$

$$\text{Truck Number} = 0.623 + \frac{(0.658 + 1.095)}{2} = 1.499$$

$$\text{Design ESAL} = 1.499 * 181.036$$

$$= 271,373$$