

Please check whether you have got the right question paper.

1. Q. No. 1 is compulsory
2. Attempt any three questions from remaining five questions.
3. Assume any data suitably if not given and state it clearly.

1. (a) Explain three layered analysis system for flexible pavement design. [05]

(b) A two- lane two- way carriageway carries a traffic of 2500 cvpd. The rate of growth of traffic is 7.5% per annum. The design life is 15 years. The vehicle damage factor is 3. The CBR value of soil is 5%. Calculate the cumulative number of standard axles to be catered in the design [05]

(c) How do flexible pavement undergo plastic deformation due to wheel loading? [05]

(d) What are the requirements of an airport pavement? [05]

2 (a) Define vehicle damage factor. What are the factors affecting VDF and explain its significance in the design of pavement. [10]

(b) Explain typical rigid pavement failure with neat sketches. [10]

- 3 (a) Design a cement concrete pavement for the following conditions: [10]

Design wheel load	= 4100 Kg
Present traffic	= 300 cvpd
Design life	= 20 years
Traffic growth rate	= 7%
Temperature variation	=15°C
Modulus of subgrade reaction	=8 kg/cm <sup>3</sup>
Concrete flexural strength	= 40 kg/cm <sup>2</sup>
Modulus of elasticity	= 3x10 <sup>5</sup> kg/cm <sup>2</sup>
Poisson's ratio	= 0.15
Coeff. Of thermal expansion	= 10 x 10 <sup>-6</sup> /°C

Refer fig 1 ,2 &3 and Table 1

(b) Explain the typical failures in flexible pavement with neat sketches. [10]

4. (a) What are the various statistical methods of quality control? Explain any one. [10]

(b) Discuss Benkelman Beam deflection method for design of overlays with neat sketches [10]

5. (a) What are the advantages and drawbacks of cement concrete road? Explain cement grouted and rolled concrete layer and their uses [10]
- (b) Explain the mechanism of damage to highways due to faulty drainage. [10]
6. Write short note on : [20]
  - (a) Pavement management System
  - (b) Roads in Marshy Area
  - (c) Various tests on Bitumen
  - (d) Quality Control in Highway Engineering

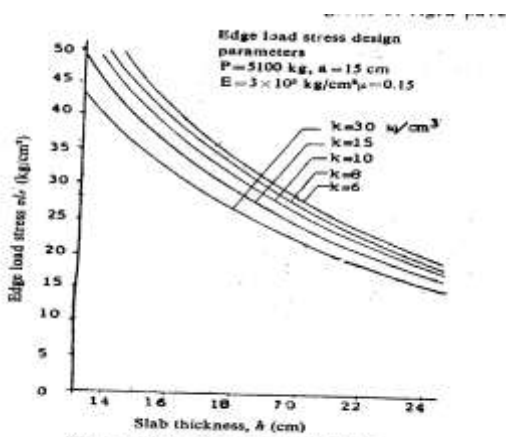


Fig. 1. Design chart for calculation of edge load stress

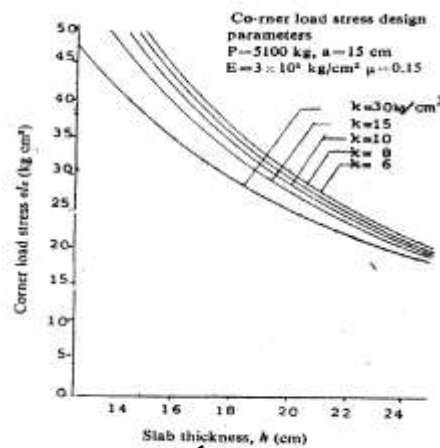


Fig. 2. Design chart for calculation of corner load stress

Chart for determination of coefficient C

$L/l$ or $W/l$	C	$L/l$ or $W/l$	C
1	0.000	7	1.030
2	0.040	8	1.077
3	0.175	9	1.080
4	0.440	10	1.075
5	0.720	11	1.050
6	0.920	12	1.000

Table 1

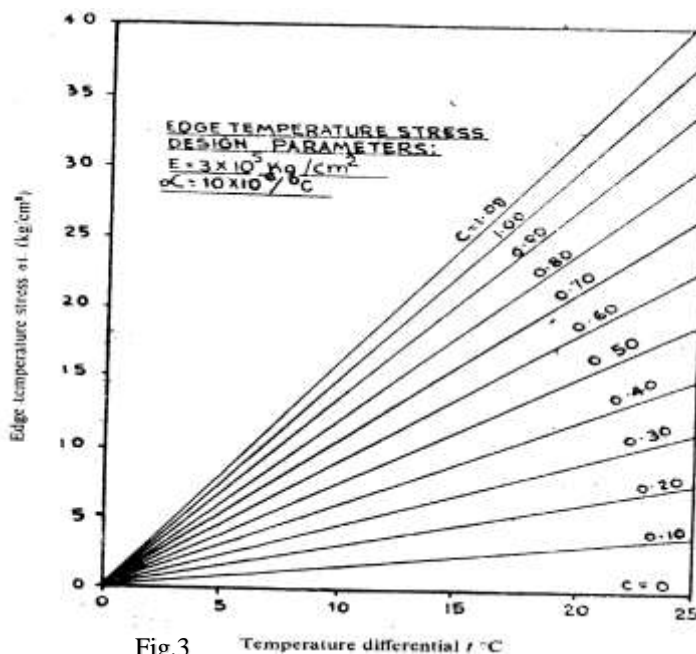


Fig.3 Edge temperature stress vs. Temperature differential t °C