Paper Code CE 502 **Roll No.** | | | | | | | | | | |

B.Tech.
(SEM- V) ODD SEMESTER EXAMINATION, 2015-16
TRANSPORTATION ENGINEERING-I

Time: 3 Hours **Total Marks: 100**

Note: **(i)** Attempt ALL questions.
(ii) Marks are indicated against each question.
(iii) Assume any data suitably, if required.

1. Attempt any **FOUR** parts of the following **5x4=20**

(a) Discuss the second 20 year (1961-81) road development plan and its salient features in brief.

(b) Briefly outline the classification of roads based on location and function as suggested in Nagpur Road Plan.

(c) The area of certain district in India is 13,400 sq km and there are 12 towns as per 1091 census. Determine the lengths of different Categories of roads to be provided in this district by third road developed plan.

(d) What are the various road patterns adopted in road planning? Explain with the help of neat sketches.

(e) What was the recommendation of jaykar committee and how it was implemented?

(f) Write a note on Road Development Plan Vision 2021.

2. Attempt any **TWO** parts of the following **10x2=20**

(a) A national highway passing through rolling terrain in heavy rain fall area has a horizontal curve of radius 500m. Design the length of transition curve assuming suitable data.

(b) A vertical summit curve in to be designed when two grades, +1/50 and -1/80 meet on a highway. The stopping sight distance and overtaking sight distance required are 180 and 640 m respectively. But due to site conditions the length of vertical curve has to be restricted to a maximum value of 500, if possible. Calculate the length of summit curve needed to fulfill the requirements of (a) stopping sight distance (b) overtaking sight distance or at least intermediate sight distance, and discuss the results.

(c) Derive an expression for designing the Overtaking Sight Distance.

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3. Attempt any **TWO** parts of the following **10x2=20**

(a) What is the significance of traffic volume survey and how it is carried out? How the date is presented?

(b) What is the use of traffic speed survey? How the spot speed traffic data is collected and various percentile speeds are determined? What is space mean speed and time mean speed?

(c) Show the relationship between speed and travel time, speed and density, speed and volume, and density and volume through graphical presentation and discuss.

4. Attempt any **TWO** parts of the following **10x2=20**

(a) What are the various tests carried out on road aggregates? Explain the procedure of determining the Impact test on road aggregates.

(b) Determine the warping stresses at interior, edge and corner of a 25 cm thick cement concrete pavement slab with transverse joints at 5.0 m interval and longitudinal joints at 3.6m intervals. The modulus of subgrade reaction K is 6.9 kg/cm^3, and radius of loaded area is 15cm. Assume maximum temperature difference during day to be 0.6 ^oC per cm slab thickness (for warping stresses at interior and edge) and max temperature differential of 0.4 ^oC per cm of slab thickness during the night (for warping stress at corner) use the data given below: e=10X10^{-6} per ^oC E= 3X10^5 kg/cm^2 μ = 0.15. Use Fig-1.

(c) Write the procedure of flexible pavement design, step by step as per IRC: 37-2012 in brief.

5. Attempt any **TWO** parts of the following **10x2=20**

(a) Write the construction procedure of WBM roads.

(b) What do you understand by bitumen mastic wearing course? Write the construction steps of mastic asphalt.

(c) Write short notes on any two:

(i) Prime coat
(ii) Tack coat
(iii) Seal coat
(iv) Surface Dressing

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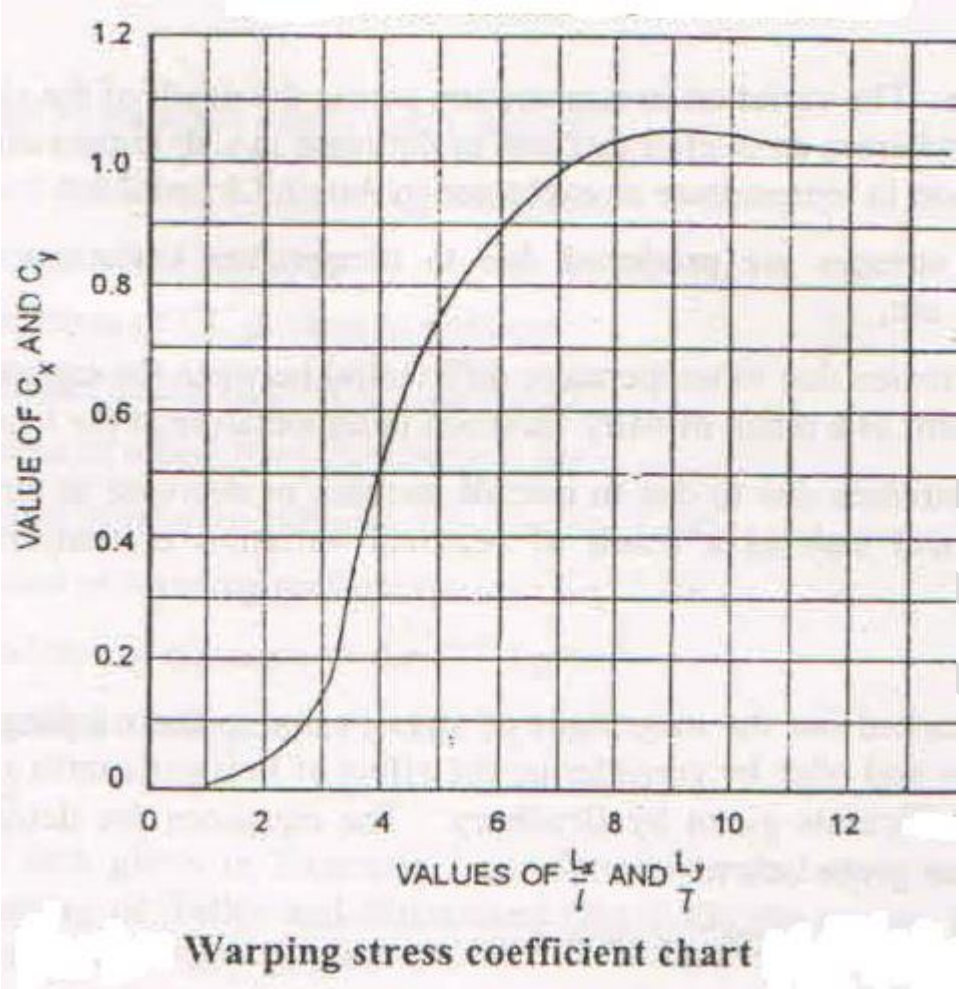

Warping stress coefficient chart

Fig-1

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