

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2131

Roll No.

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B.Tech.
(SEMESTER-V) THEORY EXAMINATION, 2012-13
TRANSPORTATION ENGINEERING – I

Time : 2 Hours]

[Total Marks : 50

Section – A

1. Attempt **all** parts. Each part carries equal marks. **10 × 1 = 10**
- (a) Define highway engineering. Enlist different modes of transportation.
 - (b) Enlist and define the types of roads based on load transported and tonnage.
 - (c) Define National Highway and State Highway.
 - (d) Enlist the various road patterns.
 - (e) Define “Camber”. What is the purpose of providing camber to the road surface ?
 - (f) Define “Over taking sight distance” and “over taking Zones”.
 - (g) Define surface dressing.
 - (h) What is WBM ?
 - (i) Define “Desire Lines”.
 - (j) What is temperature stress ?

Section – B

2. Attempt any **three** parts of the following. Each part carries equal marks. **5 × 3 = 15**
- (a) Discuss briefly the classification of traffic signs according to Indian Motor Vehicle Act. Give two examples with neat sketch for each classification.
 - (b) Write the short notes on (i) Thirtieth highest hourly traffic volume (ii) Traffic volume study.

- (c) Enumerate the steps in the construction of cement concrete pavement.
- (d) Determine the spacing between contraction joints for 3.5 metre slab width having thickness of 20 cm and $f = 1.5$, for the following two case :
- (i) For plain cement concrete, $S_c = 0.8 \text{ kg/cm}^2$
- (ii) For reinforcement cement concrete, 1.0 cm dia. bars at 0.30 m spacing.
- (e) Calculate the stresses at interior, edge and corner of a cement concrete pavement by Westergaard's stress equations :

Modulus of elasticity of concrete = $3.0 \times 10^5 \text{ kg/cm}^2$

Poisson ratio for concrete = 0.15

Thickness of concrete pavement = 18 cm

Modulus of subgrade reaction = 8.5 kg/cm^2

Wheel load = 5100 kg

Radius of loaded area = 15 cm^2

Section – C

Attempt **all** questions. Each question carries equal marks : **5 × 5 = 25**

3. Attempt any **two** parts of the following. Each part carries equal marks. **(2.5 × 2 = 5)**

- (a) Explain the CBR method of pavement design. How is this method useful to determine thickness of component layers ?
- (b) Discuss the various types of Traffic signals.
- (c) Explain preliminary survey for highway location in brief.

4. Attempt any **two** parts of the following. Each part carries equal marks : **(2.5 × 2 = 5)**

- (a) Calculate the length of transition curve for a design speed of 80 kmph at horizontal curve of radius 300 m in rural area. Assume suitable data.
- (b) What is traffic rotary ? What are its advantages and limitations in particular reference to Indian conditions ?
- (c) Explain IRC method of rigid pavement design.

5. Attempt any **two** parts of the following. Each part carries equal marks : **(2.5 × 2 = 5)**
- (a) Explain Bombay road plan.
 - (b) Explain maximum and minimum super elevation in brief.
 - (c) Calculate the stopping sight distance for design speed of 100 kmph. Take the total reaction time 2.5 seconds and coefficient of friction = 0.35.
6. Attempt any **two** parts of the following. Each part carries equal marks : **(2.5 × 2 = 5)**
- (a) Explain bituminous bound macadam and Asphaltic concrete.
 - (b) Derive the expression for calculating the overtaking sight distance on a highway.
 - (c) Design the super elevation required at a horizontal curve of radius 300 m for speed of 60 kmph. Assume suitable data.
7. Attempt any **two** parts of the following. Each part carries equal marks : **(2.5 × 2 = 5)**
- (a) What are the objects of providing transition curves on horizontal alignment of highways ?
 - (b) Explain vertical curves briefly.
 - (c) Write the short notes on the following :
 - (i) Sheet asphalt
 - (ii) Mastic asphalt
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