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

PAPER ID : 2131   Roll No. ☐☐☐☐☐☐☐☐☐☐

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, $S_c = 0.8$ 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 = 3.0×10^5 kg/cm^2

Poison 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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