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Third Semester B. E.(Civil) (CGS) Examination

TRANSPORTATION ENGINEERING – I

Paper – 3 CE 03

(USC – 10174)

P. Pages : 3

Time : Three Hours]

[Max. Marks : 80

Note : (1) All questions carry marks as indicated.
(2) Answer **Three** questions from Section A and **Three** questions from Section B.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answer wherever necessary with the help of neat sketches.
(5) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION A

1. (a) Explain the necessity and object of highway planning.   7

    (b) Discuss the desirable properties of bitumen compare tar and bitumen.
                                                                             6

OR

2. (a) What are the characteristics of road transport in comparison with other systems ?   6

    (b) Explain briefly the various stages of work in new Highway project.   7

3. (a) Derive an expression for finding the extra widening required on horizontal curve.   7

    (b) A vertical summit curve is formed at the intersection of two gradients, + 3.0 and - 5.0 percent. Design the Length of summit curve to provide a stopping sight distance for a design speed of 100 Kmph. Assume other data.
                                                                             7

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OR

4. (a) What are the factors on which the design of superelevation depends ? Enumerate the steps for practical design of superelevation. 7

    (b) Calculate the safe overtaking sight distance for a design speed of 96 Kmph. The acceleration of overtaking vehicle is 2.5 Kmph/sec. Assume suitable data. 7

5. (a) Discuss Westergaard's concept of temperature stresses in concrete pavements. 6

    (b) What are the various methods of Flexible Pavement design ? Explain group index method. 7

OR

6. (a) Explain ESWL and the concept in the determination of the equivalen wheel load . 6

    (b) Find the critical combination of stresses at edge and corner region of c.c. pavement.

        (i) Radius of relative stiffness = 60.8 cm

        (ii) Modulus of elasticity = 3 x 10^5 kg/cm^2

        (iii) Spacing between transverse joint = 4.5 m

        (iv) Coeff of Restraint = 1 5

        (v) Unit wt of Conc = 2400 kg/m^3

        (vi) Edge load stress = 24 kg/cm^2

        (vii) Corner load stress = 28 kg/cm^2

        (viii) Warping stress at edge = 27.54 kg/cm^2

        (ix) Warping stress at corner = 9.15 kg/cm^2

SECTION B

7. (a) Discuss the various traffic studies and their importance. 7

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(b) Enumerate the various types of intersections and the basic principles involved.

6

OR

8. (a) What is a traffic rotary ? Explain briefly the various design factors considered in rotary intersection design. 7

(b) Explain the various types of traffic signals and thier functions. 6

9. (a) What are different factors which decide foundation depth of a pier. 7

(b) Discuss briefly the characteristics of an ideal site for a bridge. 6

OR

10. (a) What is economic span of a bridge? Derive the expression for the economic span. 7

(b) Differentiate between :—

(i) Minor and major bridges

(ii) Causeway and culvert. 6

11. (a) What is meant by normal scour depth. How would you estimate the normal scour depth for different types of steam? 7

(b) What are the various methods of strengthening of bridge? Explain in brief.

6

OR

12. (a) A bridge has a linear waterway of 150 m across a stream whose natural linear waterway is 220 m. If the average flood discharge is 1200 m^3/s and average flood depth is 3 m. Calculate afflux under the bridge. 7

(b) Distinguish between clearance and free board with a neat sketches. 6

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