[6263]-54

B.E. (Civil Engineering)
TRANSPORTATION ENGINEERING
(2019 Pattern) (Semester - VII) (401002)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

   1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*

   2) *Figures to the right indicates full marks.*

   3) *Use of electronic pocket calculator is allowed.*

   4) *Assume suitable data if necessary.*

   5) *Neat diagrams must be drawn wherever necessary.*

Q1) a) Explain any two important pavement surface characteristics with respect to highway geometric design. **[6]**

    b) Distinguish clearly between Camber and Super elevation. How super elevation is provided in the field. **[6]**

    c) Calculate the absolute minimum and ruling minimum radius of horizontal curve for a design speed of 80 kmph. **[6]**

<div align="center">OR</div>

Q2) a) State and explain the factors governing the stopping sight distance. **[6]**

    b) Calculate safe stopping sight distance for a design speed of 100 kmph. Assume any other data suitability. **[6]**

    c) What are the various vehicular characteristics which affects the road design? Briefly explain. **[6]**

Q3) a) What are the desirable properties of the sub grade soil? **[6]**

    b) Explain the CBR and the test procedure for laboratory and field tests. How are the results of the test obtained and interpreted? **[6]**

    c) Explain how Impact Test on aggregates is done in the laboratory. How are the results of the test interpreted? **[6]**

<div align="center">OR</div>

Q4) a) What is Foamed Bitumen? How foamed bitumen is prepared and where it is used. **[6]**

b) Explain the Flash and Fire Point Test. **[6]**

c) Discuss the desirable properties of bitumen. Compare tar and bitumen. **[6]**

Q5) a) Draw a neat cross section of flexible pavement. Explain in brief functions of various layers of flexible pavement. **[5]**

b) Explain different stresses in flexible pavements. **[6]**

c) Compute the radius of relative stiffness of 15cm thick cement concrete slab from the following data : **[6]**

Modulus of elasticity of cement concrete = 210000 kg/cm^2

Poisson's ratio for concrete = 0.13

Modulus of subgrade reaction,

K = i) 3.0 kg/cm^3 ii) 7.5 kg/cm^3

OR

Q6) a) Explain with sketch equivalent single wheel load ESWL. **[5]**

b) Calculate the stresses at interior and corner regions of cement concrete pavement using Westergaard's stress equations. Use the following data: **[6]**

Modulus of elasticity of cement concrete = 300000 kg/cm^2

Wheel load = 5100 kg

Pavement thickness = 18 cm

Poisson's ratio for concrete = 0.15

Modulus of subgrade reaction = 6.0 kg/cm^3

Radius of contact area 15 cm

c) Explain the importance of dowel and tie bars in rigid pavements. **[6]**

Q7) a) Define Pier. Draw a neat sketch of the Hammer head shape pier and Multiple bent Pier. **[6]**

b) A bridge is proposed to be constructed across an alluvium stream carrying a discharge of 300 m^3/s. Assume silt factor, f = 1.10, determine the maximum scour depth when the bridge consists of 5 spans of 20 m each. **[6]**

c) Define Rail Guage and explain its types. **[5]**

OR

Q8) a) Define Abutment. State the various types of abutments. Also State the requirements of good Abutments. **[6]**

b) A bridge has a linear waterway of 110m constructed across a stream, whose natural waterway is 190 m. If the flood flow is 950 Cumecs and the mean depth of flow is 2.75m, Calculate the Afflux under the bridge. **[6]**

c) Explain the function of ballast. **[5]**

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