[4759] - 15

B.E. (Civil)

TRANSPORTATION ENGINEERING - II

(2008 Pattern) (Semester -II)

Time :3 Hours]   *[Max. Marks : 100*

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section -I & Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section - II.*
2) *Answers to the two Sections should be written in separate answer books.*
3) *Figures to the right indicate full marks.*
4) *Use of logarithmic tables, slide rule, Mollies charts, electronics pocket calculator and steam tables is allowed.*
5) *Assume suitable data, if necessary.*
6) *Neat diagrams must be drawn wherever necessary.*

SECTION - I

Q1) a) What are the various methods of classification of roads? Briefly outline the classification based on location and function as per Nagpur road plan. **[6]**

b) Discuss the Second Twenty year Road development plan of 1961-1981 and its salient features. **[4]**

c) Explain in brief the Following: **[6]**

  i) Traffic Volume Survey

  ii) Origin and Destination study

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

Q2) a) Briefly explain the requirements of an Ideal alignment. **[6]**

b) Explain in brief the Engineering Surveys needed for Highway Location.**[6]**

c) Write a short note on Traffic signs. **[4]**

Q3) a) Draw a Typical cross section of National Highway in Embankment. **[4]**

b) Define Stopping Sight Distance. Determine the stopping sight distance for a vehicle moving with the design speed of 80 Kmph for Two way traffic on a two lane road. Assume suitable data as per IRC recommendations. **[6]**

c) Define Camber. What are the objects of providing camber. Discuss the effects of shape of camber. **[6]**

OR

Q4) a) Derive an expression for finding the Extra widening on horizontal curves. **[6]**

b) What are the objects of providing Transition curves on the horizontal highway alignment. **[4]**

c) Write a short note on PIEV theory. **[6]**

Q5) a) Explain in brief the Laboratory procedure of determining Impact Value of road aggregate. **[6]**

b) Draw a neat labeled cross section of Flexible and Rigid pavement. **[6]**

c) The CBR value of Subgrade soil is 5%, calculate total thickness of pavement using design formula developed by the U.S.Corps of Engineers. Assume Wheel load = 4100 Kg and Tyre Pressure = 6 Kg/cm². **[6]**

OR

Q6) a) Explain in brief the Laboratory procedure of determining Grade of Bitumen. **[6]**

b) Write a short note on types of joints in Rigid Pavement. **[6]**

c) Calculate the radius of relative stiffness and Equivalent Radius of Resisting section using following Data: Wheel Load = 5100 kg, Pavement thickness = 18cm, Poisson's ratio = 0.15, Modulus of Subgrade reaction = 6.0 Kg/cm³, Modulus of Elasticity of Cement Concrete = $3.0×10^5$, Radius of contact area = 15 cm. **[3+3]**

SECTION- II

Q7) a) Explain in brief the following: **[6]**

    i)   Minimum Circling radius

    ii)   Apron and Taxiway

  b) Discuss types of survey to be carried out for site selection of an Airport? **[4]**

  c) Write a short note on Wind Rose Diagram and is importance. **[6]**

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

Q8) a) Explain with the help of a sketch, three controls for Rolling, Pitching and Yawing Movements of a Aeroplane. **[6]**

  b) State the advantages and disadvantages of air Transportation. **[5]**

  c) What is mean by Basic Runway length. Discuss the corrections that are to be applied for determining Basic runway length. **[5]**

Q9) a) A bridge needs to be constructed across an Alluvial stream having discharge of $300 m^3$/sec. Calculate the depth of maximum scour when the bridge consists of: **[6]**

    i)   Two spans of 35m each, and

    ii)   Three spans of 30m each

    Assume the value of silt factor =1.1.

  b) Derive an Equation for economic span of the Bridge. Also state the assumptions. **[6]**

  c) Write a short note on Scour Depth. **[4]**

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

Q10) a) Define Bridge. State the various points to be considered while selecting an Ideal Bridge site location. **[4]**

b) The catchment area of stream is of sandy soil with thick vegetation cover and the area of catchment is 5000 hectares. The length of the catchment is 20Km and the fall in level from the critical point to the bridge site is 150m. Calculate the peak runoff for designing the bridge if the severest storm recorded yields 20Cm of rain in 5 hours. Assume coefficient to account for losses due to absorption = 0.10 and coefficient to account for distribution of rainfall in space = 0.77. **[6]**

c) Define the following terms: **[6]**

   i) Afflux

   ii) Free Board

   iii) Scour Depth

*Q11)*a) Define Pier. State the requirements of good Pier. **[6]**

b) Why Bearings are provided in bridges. Explain in brief the Roller type of bearing. **[6]**

c) Write a short note on Erection and Maintenance of Bridges. **[6]**

OR

*Q12)*a) How will you account for the following in the design of Highway Bridge. **[6]**

   i) Live Load

   ii) Dead Load

   iii) Buoyancy

b) Explain in brief the various types of Culverts. **[6]**

c) Explain in brief the necessity of Movable Span bridges. Also state the various types of Movable Span bridges. **[6]**

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