Total No. of Questions : 12]

SEAT No. :

P1685

[Total No. of Pages : 4

[4859]-15
B.E. (Civil)
TRANSPORTATION ENGINEERING-II
(2008 Course) (Semester-II)

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

Instructions to the candidates:

1) ***Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 for Section-I and Q. 7 or Q. 8, Q. 9 or Q. 10, Q. 11 or Q. 12 from Section-II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rule, Mollier charts, electronic 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) State comparison between First Road Development Plan and second Road Development Plan. **[4]**

b) The area of a certain district in India is 13,400 Sq. Km and there are 12 Towns as per 1981 census. Determine the lengths of different categories of roads to be provided in this district by the year 2001. **[6]**

c) Explain in brief the following: **[3 + 3 = 6]**

i) Traffic Volume Survey.

ii) Accident Studies.

OR

Q2) a) Write a short note on Origin and Destination Study. **[4]**

b) What are the various objectives of preliminary survey for highway location? Explain in brief the various steps involved in conventional method of surveying. **[3 + 3 = 6]**

c) Explain with a neat sketches various road patterns commonly in use. **[3 + 3 = 6]**

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Q3) a) Enumerate the steps for practical design of Super elevation. **[6]**

b) State the various factors governing the overtaking sight distance. Find the safe overtaking sight distance for a highway having design speed of 100 Kmph. Assume Maximum acceleration of overtaking vehicle = 0.53 m/sec^2. **[2 + 4 = 6]**

c) Derive an expression for finding the Extra Widening required on Horizontal Curve. **[6]**

OR

Q4) a) A vertical summit curve is formed at the intersection of two gradients, +3.0% and –5.0%. Design the length of summit curve to provide a stopping sight distance for a design speed of 80 Kmph. Assume other data. **[6]**

b) Write a short note on construction of WBM road. **[6]**

c) Define stopping sight distance. Explain in brief the factors on which the stopping sight distance depends. **[1 + 5 = 6]**

Q5) a) State the various desirable properties of aggregates used in road construction. Explain in brief the stepwise procedure of determining Flakiness Index of Aggregate. **[2 + 4 = 6]**

b) Calculate the Stress at interior region of a cement concrete pavement using Westerggards stress equation. Use the following data:

Wheel Load = 5100 kg, Modulus of Elasticity of concrete = 3×10^5 kg/cm^2, Pavement thickness = 18 cm, Poissons ratio = 0.15, Modulus of Subgrade reaction = 6.0 kg/cm^3, Radius of contact area = 15 cm. **[6]**

c) Explain in brief the following: **[2 + 2 = 4]**

i) Dowel bar. ii) WMM.

OR

Q6) a) A two lane two way road is at present carrying a traffic of 1000 Commercial Vehicle Per Day (CVD) it is to be strengthened for growing traffic needs. The VDF has been found to be 3.0. The rate of growth of traffic is 10% per annum. The period of construction is 5.0 years. The pavement is to be designed for 15 years after construction. Calculate the cumulative standard axles to be used in design. **[6]**

b) Write a short note on Joints in Concrete Pavement. **[4]**

c) What is softening point of Bitumen? Explain in detail the laboratory procedure of determining the softening point of Bitumen. **[1 + 5 = 6]**

SECTION-II

Q7) a) Explain in brief the following: **[3 + 3 = 6]**

i) Wind Rose Type 1.

ii) Taxiway.

b) Explain the characteristics of good airport layout. Draw a neat sketch of typical airport layout of single runway. **[4 + 2 = 6]**

c) How Runway orientation should be done? Discuss. **[4]**

OR

Q8) a) Enlist and explain in brief the various aircraft characteristics. **[2 + 4 = 6]**

b) Explain the following terms: **[3 × 2 = 6]**

i) Hanger.

ii) Minimum Circling radius.

iii) Calm period.

c) Explain in brief the advantages and limitation of air transportation. **[2 + 2 = 4]**

Q9) a) State the various methods commonly used in estimation of flood discharge at a bridge site. How is the Linear Waterway of a bridge is fixed. **[2 + 4 = 6]**

b) Calculate the flood discharge from the catchment of 65 Square kilometers when the rainfall during the storm was 15 cm. in two hours. The time of concentration is 20 hours and the runoff coefficient for the catchment is 0.35. **[6]**

c) What is scour depth? State factors upon which pattern of scour depend. Why allowance should be made in the observed scour depth. **[2 + 2 + 2 = 6]**

OR

Q10)a) Discuss the various factors which should be considered while selecting a site for a bridge. **[6]**

b) Determine the waterway of the bridge across a stream with a flood discharge of 300 m^3 / sec., velocity 1.5 m/sec and width of flow at high flood level is 70 m. The allowable velocity under bridge is 1.8 m/sec. Assume permissible safe velocity under the bridge is equal to 90% of allowable velocity under the bridge. **[6]**

c) Derive an equation for Economical span of a bridge. State the assumptions clearly. **[4 + 2 = 6]**

Q11)a) Define Pier. State the various types of piers also State the requirements of good pier. **[2 + 2 + 2 = 6]**

b) What is Cut water and Ease Water? Why it is necessary? Sketch any two shapes of Cut water and Ease Water. **[2 + 2 + 2 = 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 **[2 + 2 + 2 = 6]**

i) Centrifugal Force.

ii) Earthquake Force.

iii) Wind Load.

b) Define Bridge bearing. State the types of bearings. Why Bearings are necessary in bridges. **[2 + 2 + 2 = 6]**

c) Explain the following with a neat sketches: **[2 + 2 + 2 = 6]**

i) Abutment pier.

ii) Cantilever bridge.

iii) Traverser bridge.

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