R13

Code No: 126AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, April - 2018
TRANSPORTATION ENGINEERING – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A
(25 Marks)

1.a) State the classification of roads as per first road development plan. [2]
  b) Discuss the objectives of reconnaissance survey and state the instruments used for this purpose. [3]
  c) Sketch the typical cross-section of a national highway and indicate all cross-sectional elements. [2]
  d) What are the transition curves? Explain the functions. [3]
  e) Explain the various causes of road accidents. [2]
  f) Define: Spot speed, Running speed, Space-mean speed and Time-mean speed. [3]
  g) What are the various traffic controls required at an intersection? [2]
  h) Write a short notes on: Grade separated intersections and traffic islands. [3]
  i) Explain the requirements of a good highway drainage system. [2]
  j) What are the desirable characteristics of stone-aggregates for road construction? [3]

PART - B
(50 Marks)

2.a) What is the need for highway planning? Discuss the benefits of well-planned highway system in the social and economic development of a country.
  b) Describe and compare the various road development plans in India. [5+5]

OR

3.a) What are the factors effecting highway alignment? Discuss in detail.
  b) What are the various engineering drawings necessary for implementing a highway project? What are their recommended scales? [5+5]

4.a) A two-lane highway with design speed of 120kmph is aligned with a horizontal curve of radius 200m. What is the super-elevation required to maintain this speed? If the maximum super-elevation rate of 0.07 and coefficient of lateral friction of 0.15 is to be provided along with limiting the radius to 200m, calculate the allowable speed.
  b) A rising gradient of 1 in 25 meets a falling gradient of 1 in 50 on a national highway. The minimum stopping sight distance is 150m. Design speed is 100km/hr, determine the length of summit curve and the distance of highest point from the starting of 1 in 25 gradient. [5+5]

OR

5.a) Determine the safe overtaking sight distance required for a two lane, two-way traffic road, given the speeds of overtaking and overtaken vehicles are 100 kmph and 70 kmph respectively. The acceleration of overtaking vehicle is 2.4 kmph/sec, spacing between vehicles is 20m, reaction time of driver is 2 sec and speed of vehicle coming in the opposite direction is 80kmph.

   b) Find out the minimum length of transition curve required and the shift required to join the transition curve with circular curve of radius 200m, for a road passing through rolling terrain. Given design speed 65kmph, carriage way width 7.5m, rate of super elevation 1 in 150 and the road is rotated about the center line to achieve super elevation. [5+5]

6. What are the details collected in origin and destination surveys? Explain the most commonly adopted methods of O&D survey. [10]

OR

7. What are the objectives of road markings and road signs? Classify road markings and traffic signs giving two examples in each category. [10]

8. What are the various types of at-grade intersections? Describe them with suitable sketches. Mark the conflict points at T-intersection and four-legged intersection (for two-way traffic in both directions). [10]

OR

9.a) What are the purposes of channelization? What are the salient features of channelizing islands?

   b) Explain the design considerations for a rotary. Discuss the advantages and limitations of a rotary intersection. [5+5]

10. Explain the steps in the construction of gravel roads and Water bound macadam roads. [10]

OR

11. What is the function of joints in cement concrete pavements? Write short notes on: Expansion joints, Contraction joints and Warping joints. [10]

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