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Code No: 126ZE

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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