Code No: 126AE **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech III Year II Semester Examinations, May - 2016
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 carries10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) Classify the road systems at regional/ national and urban level. [2]
b) What are the factors effecting highway alignment? [3]
c) What are the design issues in highway geometrics? [2]
d) How do you frame design controls in geometrics of highway explain from each featurewith specification? [3]
e) What are the different traffic signs and their relevance? [2]
f) Present different types of road markings, their specifications and their relevance. [3]
g) Draw and explain different types of grade separated interchanges. [2]
h) Draw typical conflict points in an intersection and suggest different types oftreatments. [3]
i) Present different types of pavement failures. [2]
j) Draw the cross sectional view of joints and filler in concrete pavements. [3]

PART - B

(50 Marks)

2.a) Present on different road developments in India.
b) What are the different road network patterns and explain their benefits? [5+5]

OR

3.a) Present on Engineering surveys to be conducted for highway construction.
b) Present the different drawings to be developed for facilitating to construct a highway. [5+5]

4.a) Develop the equation form for super elevation design.
b) What is the IRC suggested approach for super elevation implementation? [5+5]

OR

5.a) Develop the equation form for Extra widening at transition curve.
b) Develop the equation forms for designing the different vertical curves. [5+5]

6.a) Explain the survey procedure for speed studies and present the different forms ofrepresentation.
b) What are the different types of parking surveys and explain them in detail? [5+5]

OR

7.a) Present on accident record form and different diagram to analyze accidents.
b) Present the design procedure of isolated traffic signal. [5+5]

8.a) Present the different types of islands and their functionality in reducing the conflicts.
b) Present the design procedure of rotary as traffic Control Island. [5+5]

OR

9.a) What are the requirements of at grade intersection?
b) Present on different types of intersections. [5+5]

10.a) Present the construction procedure of any black top road?
b) Present the test procedures to characterize the highway materials? [5+5]

OR

11.a) Present the construction procedure of cement concrete road?
b) Present the construction procedure of concrete joints? [5+5]

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PART - A

(25 Marks)

1.a) List the various types of road patterns. [2]
b) List the various requirements of Highway Ideal Alignment [3]
c) List the various assumptions in the analysis of safe Overtaking Sight Distance. [2]
d) Calculate the extra width required for a two lane highway having a horizontal curve of radius 200m,if the design speed is 80 Kmph. [3]
e) Draw a neat sketch of Condition and Collision diagram. [2]
f) Define traffic volume and traffic density and speed. [3]
g) List the factors to be considered in the design of intersection at grade. [2]
h) List the various types of on street and off street parking facilities. [3]
i) List the various tests to be conducted to evaluate the strength properties of soils [2]
j) Differentiate between Tack Coat and Prime Coat. [3]

PART - B

(50 Marks)

2.a) Discuss in detail ,the various factors controlling the highway alignment with sketches.
b) What is the necessity of Realignment? List and explain the various steps in Realignment. [5+5]

OR

3.a) What are the various recommendations of Jayakar Committee? How were these implemented?
b) What are the various methods of classifying roads? Briefly outline the classification of urban roads. [5+5]

4.a) Explain PIEV Theory and the total reaction time of driver .
b) Calculate the length of transition curve using the following data:
Design speed =65 Kmph, Radius of circular curve = 220m, pavement width including extra widening = 7.5 m, allowable rate of introduction of super elevation (pavement is rotated about the centerline) is 1 in 150. [5+5]

OR

5.a) With the help of a neat sketch, explain the attainment of super elevation in the field.
b) Calculate the length of vertical valley curve required between -1/30 and +1/25 grades for a speed of 80 Kmph to satisfy comfort and headlight sight distance requirements. [5+5]

6.a) Identify and explain by grouping the vehicular characteristics which affect the various elements of road design.

b) Spot speed studies were carried out at a certain stretch of a highway with mixed traffic flow and the consolidated data collected are given below.

Speed range, kmph	No of vehicles observed
0-10	12
10 – 20	18
20 - 30	68
30 - 40	89
40 - 50	204
50 - 60	255
60 - 70	119
70 - 80	43
80 - 90	33
90 – 100	9

OR

7.a) Write a note on various road user characteristics affecting the traffic.

b) Briefly explain the various objectives and methods of O and D studies. [5+5]

8.a) Briefly explain the various design factors to be considered in the design of rotary.

b) With neat sketches, explain the Different types of traffic Islands and conflicts at Intersections. [5+5]

OR

9.a) List and explain the various advantages and disadvantages of Rotary.

b) List the various advantages of at grade and Grade separated Intersections. [5+5]

10.a) List the specifications, materials and construction steps for laying Bituminous concrete.

b) Explain briefly the importance and requirements of Highway Drainage. [5+5]

OR

11.a) Discuss the desirable properties of Coarse Aggregates. List the various laboratory testconducted to find these properties.

b) Explain how the soils are classified based on HRB soil classification system. [5+5]

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