Code No: 155DJ **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, July/August - 2023

TRANSPORTATION ENGINEERING

(Civil Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Explain salient features of Indian Road Congress.	[2]
b)	What are the objectives of highway planning?	[3]
c)	What is the role of transition curves?	[2]
d)	Write about extra widening width at curves.	[3]
e)	What are the factors affecting LOS?	[2]
f)	What are the factors to be consider in signal design?	[3]
g)	What is Group Index of a soil?	[2]
h)	Why do we require modified bitumen binders?	[3]
i)	What are the critical load stresses as per Westergaard on a rigid pavement?	[2]
j)	What do you understand by the composite pavements?	[3]

PART – B

(50 Marks)

2.a) Explain the characteristics of road transport.
b) Discuss the special care to be taken while aligning hill roads. [5+5]

OR

3.a) Discuss the role of transportation in the economic and social activities of the country.
b) What are the various requirements of an ideal highway alignment? [6+4]

4.a) The radius of horizontal curve is 400m, the total pavement width at curve is 7.6m and the superelevation is 0.07. Design the transition curve length for a speed of 100 kmph. Assume pavement is rotated inner edge.
b) Explain how the vertical curve on a hump formed due to the presence of a culvert slightly above the profile may be designed? [6+4]

OR

5.a) A verticle summit curve to be designed when two grades +1/50 and -1/80 meet on a highway. The stopping sight distance and overtaking sight distance are required to be 180 and 640 m respectively. But due to site conditions the length of vertical curve has to be restricted to a maximum value of 500 m if possible. Calculate the length of summit curve needed to fulfill the requirements of i) Stopping sight distance ii) Overtaking sight distance or at least intermediate sight distance.
b) Explain the PIEV theory. [6+4]

6.a) Derive the relationship between speed, density and volume with neat sketches.
b) Explain in detail the factors to be considered in design of road lighting. [5+5]

OR

7.a) Discuss the steps involved in collection of accident data.
b) Explain the need for parking studies. How do you estimate the parking demand? [5+5]

8.a) Apprise the density and void analysis in Marshall bituminous mix design.
b) Explain the procedure for the correction for smaller plate size in modulus of sub-grade reaction test. [6+4]

OR

9.a) Discuss the role of aggregate shape test and detail the test procedure.
b) Explain the importance of modified binders and their applications. [5+5]

10.a) Explain the factors causing the warping and temperature difference in CC pavements.
b) Detail the flexible pavement design procedure by IRC guidelines and discuss the failure criteria's considered in it. [4+6]

OR

11.a) Design a new flexible pavement for a two-lane undivided carriageway using the following data.
Design CBR: 6%; Initial traffic on completion of traffic 350CVPD; average growth rate 6%; design life 15 years; VDF: 2.5
b) Classify the different types of joints in CC pavements and mention the objectives of each. [5+5]

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