Code No: 137HX

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, December-2023/January-2024
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) What are the factors affecting the highway alignment. [2]
b) Explain how the National Transport policy committee connected with road development. [3]
c) What is the meaning of highway geometric design? [2]
d) What are the factors affecting friction or skid resistance? [3]
e) What are the methods of collecting O&D data? [2]
f) How is the presentation of traffic volume data done? [3]
g) Define elemental manouvre. [2]
h) Draw a neat sketch of elliptical rotary. [3]
i) What are the critical load stresses as per Westergaard on a rigid pavement? [2]
j) What type of stresses are produced in a rigid pavement due to temperature? [3]

PART – B
(50 Marks)

2.a) Explain the development of highways with respect to Indian Context.
b) Give the details of drawings to be prepared in highway project with the recommended scales and size of the drawings. [5+5]

OR

3.a) Discuss in detail about classification of roads based on different categories.
b) Briefly explain the engineering surveys needed for locating a new highway. [5+5]

4.a) Explain various factors controlling geometric design.
b) Calculate the safe stopping sight distance for design speed of 80 kmph for two-way traffic on a single lane road. Assume f = 0.35, reaction time = 2.5 seconds, g = 9.8. [4+6]

OR

5.a) Why is it not desirable to provide a very steep cross slope on pavements?
b) Find the minimum sight distance to avoid head-on collision of two cars approaching at 90kmph and 60kmph. Given t =2.5s, f = 0.70 and brake efficiency of 50% in either case. [4+6]

6.a) Describe in detail about parking studies in traffic engineering. Distinguish between on-street and off-street parking.

b) The average normal flow of traffic on cross roads A and B during design speed are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1250 and 1000 PCU per hour respectively. The all-red time required for pedestrian crossing is 12 sec. Develop two phase traffic signal with pedestrian crossing by Webster's method. [4+6]

OR

7.a) What are the engineering and enforcement measures to reduce accident rates?

b) What is meant by road marking? What is the need for providing road markings in traffic regulation? [5+5]

8.a) Explain briefly about separated intersections. Discuss the advantages and limitations of them.

b) Draw a neat sketch of a full clover leaf and show the movement of traffic. [5+5]

OR

9.a) With a neat sketches describe different types of channelized intersections?

b) Explain briefly about capacity of rotary intersection. [5+5]

10.a) Explain the functions of the components of flexible pavements with the help of a neat sketch.

b) Calculate the stresses at interior, edge and corner regions of a rigid pavement using Westergaard's method. Wheel load P = 4100 kg; E = 3 $\times 10^5$ kg/cm^2, h = slab thickness 20cm, μ = Poisson's ratio for concrete = 0.15, k = Modulus of sub grade reaction 4.0kg/cm^2, a = Radius of wheel load distribution=15cm. [4+6]

OR

11.a) Explain the Westergaard's concept for temperature stresses.

b) Brief what type of pavement overlay needs to be designed by benkelman beam deflection method. [5+5]

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