R20 Regulation *Subject code: 3E5AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Supplementary Examinations, June/July 2023

TRANSPORTATION ENGINEERING

(Civil Engineering)

Maximum Marks: 70 Date:04.07.2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 What is the necessity of highway planning?
2 List out different road development plans.
3 Write the importance of geometric design.
4 What is meant by intermediate sight distance?
5 What are the roles of EEE in the prevention of road accidents?
6 What is the purpose of IRC method in signal design?
7 What are the different types of rotary intersection?
8 Write the examples for Grade Separated Intersections.
9 What are the factors considered in a pavement design?
10 What are bituminous materials?

Part-B

Answer All the following questions. (10MX 5=50Marks)

11 A. Explain different road network patterns with the help of neat sketches. (5 Marks)
B. Explain the various factors affecting the highway alignment. (5 Marks)

OR

12 Brief about the road development in India in a chronological order. (10 Marks)

13 A. Derive the equation for extra widening. (6 Marks)
B. A vehicle travels in a 2 lane road with a design speed of 80 kmph. Find the amount of extra widening for a radius of curvature of 210 m. (4 Marks)

OR

14 A. The speed of overtaking and overtaken vehicles is 70 kmph and 40 kmph respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.99 m/sec^2. Calculate SSD, OSD and ISD. (4 Marks)
B. Derive the expression for super elevation in highways. (6 Marks)

15 What are traffic characteristics? Explain the influence of different traffic characteristics on traffic performance. (10 Marks)

OR

16 The average normal flow of traffic on cross roads A & B during design period 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 second. Design a two phase traffic signal with pedestrian crossing by Webster's method. (10 Marks)

17 Discuss about the elements to be considered in the design of traffic island. (10 Marks)

OR

18 A. What situations justify the requirements of grade separated intersections? (4 Marks)
B. What are the basic forms of grade-intersection? Give sketches showing the details of each type. (6 Marks)

19 Design the flexible pavement for the construction of a new highway with the following data (Follow guidelines as per IRC 37 2012): (10 Marks)

- Category of road- Four lane dual carriageway
- Number of commercial vehicles in the year of completion of construction- 2400 CVPD per direction
- Annual growth rate of commercial vehicles-5%
- Design life – 15 years
- Design CBR value of subgrade soil – 5%
- Vehicle damage factor – 3.5
- Lane distribution factor – 0.75

For CBR 5%

Traffic msa	5	10	20	30	50	100
GSB (mm)	250	300	300	300	300	300
GB (mm)	250	250	250	250	250	250
DBM (mm)	55	70	100	120	125	130
BC (mm)	25	40	40	40	50	55

OR

20 What are rigid pavements and flexible pavements? Explain with neat sketches. (10 Marks)