



R20 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject code: 3E5AA

B.Tech V Semester Regular Examinations, January 2023

TRANSPORTATION ENGINEERING (Civil Engineering)

Maximum Marks: 70

Date: 20.01.2023 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 Draw any three road network pattern.
- 2 Write the road classification based on location and also as per Nagpur road plan?
- 3 Define extra widening of pavement on horizontal curves.
- 4 List out Cross-Section elements of a pavement.
- 5 Define Traffic Engineering.
- 6 Memorize the components of speed studies.
- 7 Write a short note different types of Intersections.
- 8 Difference between channelized and Unchannelized intersection.
- 9 Define Rigid pavement.
- 10 Write the components of flexible pavement.

Part-B

Answer All the following questions.

(10MX 5=50Marks)

- 11 A. The area of a certain district in India is 13400 sq.km and there are 12 towns as per 1981 census. Determine the lengths of different categories of roads to be provided in this district by the year 2001.
B. Explain the necessity and objectives of highway planning. [5+5]
OR
- 12 A. Compare the Nagpur road plan and second twenty year road plan .Discuss merits of each.
B. What are the factors affecting alignment. [5+5]
- 13 A. Illustrate about the overtaking sight distance analysis with neat sketch and expressions.
B. Summarize the following: i) ruling gradient ii) maximum gradient, and iii) exceptional gradients. [5+5]
OR
- 14 A. Write a detail account on PIEV theory.
B. The design speed of a highway is 85kmph, the radius of horizontal curve is 200m, safe coefficient of lateral friction is 0.15
i) Calculate super elevation required to maintain the speed?
ii) If the maximum super elevation is 0.07 not to be exceeded, calculate maximum allowable speed on horizontal curve without increasing the radius. [5+5]

- 15 The consolidated data collected from speed and delay studies by floating car method on a stretch of urban road of length 35kms, running North to south are given below. Determine the average values of volume. Journey speed and running speed of the traffic speed along the direction. [10]

Trip no	Direction of trip	Journey time(min-sec)	Total stopped delay (min-sec)	No. of vehicles overtaking	No. of vehicles overtaken	No. of vehicles from opposite direction
1	N-S	6-32	1-40	4	7	268
2	S-N	7-14	1-15	5	3	186
3	N-S	6-50	1-30	5	3	280
4	S-N	7-40	2-00	2	1	200

OR

- 16 Describe the various causes of road accidents and mention the preventive measures of road accidents. [10]

- 17 Illustrate the classification of traffic Island. [10]

OR

- 18 Describe the grade separated intersection with neat sketch. [10]

- 19 Compute the stresses at interior, edge and corner regions of a cement concrete pavement using Westergard's stress equation. Use the following data: [10]

Wheel load, $P=5700\text{kg}$

Modulus of elasticity of concrete, $E= 3.0 \times 10^5 \text{kg/cm}^2$

Pavement Thickness, $h= 18\text{cm}$

Poisson's Ratio $\mu=0.15$

Modulus of subgrade reaction, $K= 6.0\text{kg/cm}^3$

Radius of contact area= 15cm .

OR

- 20 Compute the radius of relative stiffness of 15cm , thick cement concrete slab from the following data. Modulus of elasticity of cement concrete is $2,10,000\text{kg/cm}^2$, Poisson's ratio $=0.15$, Modulus of subgrade reaction (i) 3kg/cm^3 & 7.5kg/cm^3 . [10]