

**II B. TECH II SEMESTER REGULAR EXAMINATIONS, JUNE - 2022**  
**TRANSPORTATION ENGINEERING**  
**(CIVIL ENGINEERING)**

Time: 3 hours

Max. Marks: 70

**Note:** Answer **ONE** question from each unit (**5 × 14 = 70 Marks**)

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UNIT-I

1. a) What are the various recommendations of Jayakar Committee? [7M]  
How were these implemented?
- b) While aligning a highway in a built up area, it was necessary to [7M]  
provide a horizontal curve of radius 300 m for a design speed  
75km/hr, length of wheel base 6m and pavement width 10.5m.  
Design super elevation, extra widening of pavement.

(OR)

2. a) What are the requirements of an ideal alignment? What are the [7M]  
precautions to be observed while aligning hill roads?
- b) Find safe over taking sight distance for a highway having a [7M]  
design speed of 80 kmph. Maximum acceleration of overtaking  
vehicle is 1.5 kmph per sec.

UNIT-II

3. a) What are the objectives of traffic volume studies and discuss [7M]  
about the role of 30<sup>th</sup> hourly volume?
- b) Briefly explain the various design factors to be considered in the [7M]  
design of rotary.

(OR)

4. a) Classify the different types of traffic signs and mention the [7M]  
general objective of each type of sign. Explain them with neat  
sketches.
- b) The average normal flow on cross roads A and B during design [7M]  
period are 400 PCU and 300 PCU per hour. The saturation  
flows are 1400 PCU and 1100 PCU per hour respectively. The  
red time required for pedestrian crossing 12 sec. Design Two  
phase signal by Webster's method.

UNIT-III

5. a) What are the desirable properties of bitumen. Enlist the [7M]  
various types of bitumen and its quality tests.
- b) Briefly illustrate the various steps in construction of a [7M]  
bituminous concrete pavement.

(OR)

6. a) What are the functions of prime coat, tack coat and seal coat in bituminous construction. [7M]  
b) Explain different types of failures in flexible pavement with the help of sketches. [7M]

UNIT-IV

7. a) List out various factors that affect the pavement design. And discuss how they influence pavement design. [7M]  
b) Explain in detail IRC method of flexible pavement design. [7M]

(OR)

8. a) Explain why contraction and expansion joints are provided in CC roads? [7M]  
b) Determine the warping stress at interior edge and corner of a 25 cm thick cement concrete pavement with transverse joints at 5m interval and longitudinal joints at 3.6 m intervals. The modulus of subgrade reaction  $k$  is  $6.9 \text{ kg/cm}^3$ . Assume Max. temperature differential during day to be  $0.6 \text{ }^\circ\text{C}$  per cm slab thickness (for warping stress at interior and edge) and max temp. Differential of  $0.4 \text{ }^\circ\text{C}$  per slab thickness during night (for warping stress at the corner). Additional data given.  
( $e = 10 \times 10^{-6}$  per  $^\circ\text{C}$ ,  $E = 3 \times 10^5 \text{ kg/cm}^2$ ,  $\mu = 0.15$ ,  $C_x = 0.88$ ,  $C_y = 0.54$ ) [7M]

UNIT-V

9. a) With help of neat sketch explain different types of rail failures [6M]  
b) Explain in detail about (a) Ballastless Track (b) Negative superelevation. (c) Widening of gauge (d) Grade Compensation. [8M]

(OR)

10. a) Describe different types of gradients used in railways. [7M]  
b) A  $5^\circ$  curve diverges from a  $3^\circ$  main curve in reverse direction in the layout of a B.G.yard. If the speed on the main line is restricted to 55 kmph determine the restricted speed on the branchline. [7M]

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