

**July-22-00282**

**B. Tech. EXAMINATION, 2022**

Semester V (CBCS)

TRANSPORTATION ENGINEERING-I

CE-506

*Time : 3 Hours*

*Maximum Marks : 60*

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*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

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**Note :** Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. 9 is compulsory.

**Section A**

1. Classify the highways in India. Also, explain in detail about the factors affecting the alignment of highways.

**5+5**

2. What are spot speed studies and origin and destination studies ? Explain their significance. Also explain briefly with neat sketch the function of object markers, rumble strips, hazard markers, speed breakers and road delineators. 5+5

### Section B

3. Calculate the length of transition curve using the following data :

Design speed 65 km/hr, radius of circular curve = 200 m, allowable rate of introduction of super elevation = 1 in 140, pavement width including extra widening = 7.5 m and superelevation = 7% (rotation about center for providing superelevation). 10

4. What factors are responsible for the design of a vertical curve at day and at night ? Provide equations for length of vertical curve. Classify vertical curves also. 10

### Section C

5. In regard to the design of rigid pavement explain the following terms : 10

(i) Resilient modulus

- (ii) Vehicle damage factor  
(iii) Temperature stresses in rigid pavement  
(iv) Equivalent radius of resisting section  
(v) Stress ratio.

6. What are the tests which are conducted on the subgrade soil as well as bitumen to determine their suitability as a pavement materials ? 10

### Section D

7. Explain in detail the steps of construction for Water Bound Macadam and soil stabilized roads. 10
8. What are the various types of distresses in flexible and rigid pavements ? 10

### (Compulsory Question)

9. Write short notes on the following : 5×4=20
- (i) Geo synthetics in pavement  
(ii) Width of carriageway  
(iii) Widening of pavements  
(iv) Geo-grids and geo-textiles in pavement  
(v) Lucknow Road Plan.