

III B. Tech I Semester Regular Examinations, November - 2015
TRANSPORTATION ENGINEERING – I
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

PART -A

- | | | |
|---|---|------|
| 1 | a) Explain briefly main features of Indian Road Congress. | [3M] |
| | b) Write a short note on Carriageway width? | [4M] |
| | c) Enumerate AADT. | [4M] |
| | d) Explain briefly on Unified Soil classification system. | [3M] |
| | e) Discuss about maximum wheel load | [4M] |
| | f) How the excavation is done in highway construction? | [4M] |

PART -B

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|---|---|-------|
| 2 | a) Discuss briefly about the objectives of highway planning. | [4M] |
| | b) Write down the classification of roads by Nagpur road plan. | [8M] |
| | c) What is meant by Reconnaissance? | [4M] |
| 3 | a) Write a short note on overturning effect. | [4M] |
| | b) Explain briefly the calculation of length of the transition curve. | [8M] |
| | c) Derive an expression of summit curve for SSD. | [4M] |
| 4 | a) Explain spot speed, running speed, space mean speed, time mean speed and average speed. How is spot speed studies carried out? | [8M] |
| | b) Explain various types of road markings. | [8M] |
| 5 | a) Define group index. Explain briefly group index of soil. | [4M] |
| | b) Explain briefly desirable properties of road aggregates. | [12M] |
| 6 | a) What are the variations in temperature that generally effect the pavement? | [8M] |
| | b) Discuss the Westergaard's concept of temperature stresses. | [8M] |
| 7 | a) Briefly list the method of construction of gravel road. | [6M] |
| | b) Write short notes on seal coat. | [6M] |
| | c) Write a descriptive note on pavement evaluation. | [4M] |

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**PART -A**

- |   |                                                              |      |
|---|--------------------------------------------------------------|------|
| 1 | a) Explain briefly the recommendations of Jayakar Committee. | [3M] |
|   | b) Explain the role of kerb.                                 | [4M] |
|   | c) Discuss thirtieth highest hourly volume.                  | [4M] |
|   | d) Evaluate grain size analysis on highway materials.        | [3M] |
|   | e) Write short notes on contact pressure.                    | [4M] |
|   | f) What are the reasons to raise grade line?                 | [4M] |

**PART -B**

- |   |                                                                                                                                                                                                                                                                                            |       |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2 | a) What are the objectives of Highway Research Board?                                                                                                                                                                                                                                      | [4M]  |
|   | b) Explain briefly the classification of road pattern.                                                                                                                                                                                                                                     | [8M]  |
|   | c) How the map study is done? Discuss.                                                                                                                                                                                                                                                     | [4M]  |
| 3 | a) Write a short note on setting out of a transition curve.                                                                                                                                                                                                                                | [4M]  |
|   | b) While aligning a highway in a built up area, it was necessary to provide a horizontal circular curve of radius 446 m. The design speed is 85 Kmph, the length of wheel base is 8m and the pavement width is 12m. Design super elevation, extra widening and length of transition curve. | [8M]  |
|   | c) What are the factors required for overturning sight distance?                                                                                                                                                                                                                           | [4M]  |
| 4 | a) Discuss various traffic studies and their importance.                                                                                                                                                                                                                                   | [8M]  |
|   | b) What are the advantages and disadvantages of traffic signs?                                                                                                                                                                                                                             | [8M]  |
| 5 | a) What are the strength characteristics of soil?                                                                                                                                                                                                                                          | [4M]  |
|   | b) Explain briefly three different tests carried out to determine the abrasion of aggregates.                                                                                                                                                                                              | [12M] |
| 6 | a) Explain briefly Mc Load method.                                                                                                                                                                                                                                                         | [8M]  |
|   | b) Describe Westergaard's stress equation for wheel loads.                                                                                                                                                                                                                                 | [8M]  |
| 7 | a) Specify the materials required for construction of WBM roads. What are the uses and limitations of this type of road?                                                                                                                                                                   | [6M]  |
|   | b) Write short notes on Mastic asphalt.                                                                                                                                                                                                                                                    | [6M]  |
|   | c) Explain the principles and uses of Bankleman Beam test?                                                                                                                                                                                                                                 | [4M]  |

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**PART -A**

- |   |                                                                       |      |
|---|-----------------------------------------------------------------------|------|
| 1 | a) Explain about central road fund.                                   | [3M] |
|   | b) Discuss road margin with neat sketches.                            | [4M] |
|   | c) Write a short note on Mechanical counters in Traffic Volume Study. | [4M] |
|   | d) Describe the Mohr circle affect on unconfined compression test.    | [3M] |
|   | e) How equivalent single wheel load influence the design of pavement? | [4M] |
|   | f) How settlement can be eliminated in construction of pavement?      | [4M] |

**PART -B**

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|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2 | a) Discuss Bombay road plan neatly.                                                                                                                                                                                                                                                                                                                                                  | [4M]  |
|   | b) How the preparation of master plan is done?                                                                                                                                                                                                                                                                                                                                       | [8M]  |
|   | c) What are the types of drawings used in preparation of highway project?                                                                                                                                                                                                                                                                                                            | [4M]  |
| 3 | a) How the total reaction time of the driver is measured?                                                                                                                                                                                                                                                                                                                            | [4M]  |
|   | b) Derive an expression for overtaking sight distance.                                                                                                                                                                                                                                                                                                                               | [8M]  |
|   | c) While aligning a hill road with a ruling gradient of 8 percent, a horizontal curve of radius 90m is encountered. Find the compensated gradient at the curve?                                                                                                                                                                                                                      | [4M]  |
| 4 | a) What are the factors on which PCU values depend?                                                                                                                                                                                                                                                                                                                                  | [8M]  |
|   | b) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1850 and 1400 PCU per hour respectively. The all red time required for pedestrian crossing is 16 seconds. Design two phase traffic signal by Webster's method?                                            | [8M]  |
| 5 | a) How the resistance of aggregates to weathering action is studied?                                                                                                                                                                                                                                                                                                                 | [4M]  |
|   | b) What are the various tests conducted on bituminous materials?                                                                                                                                                                                                                                                                                                                     | [12M] |
| 6 | a) Discuss the advantages and limitations of CBR method of design.                                                                                                                                                                                                                                                                                                                   | [8M]  |
|   | b) Calculate the stresses at interior, edge and corner regions of CC pavement using Westergaard's stress equation. Use the following data:<br>Wheel load= 5100 kg, modulus of elasticity is $3 \times 10^5$ kg/cm <sup>2</sup> , pavement thickness =18cm, Poisson's ratio of concrete = 0.15, modulus of subgrade reaction 6 kg/cm <sup>3</sup> and radius of contact area is 15cm. | [8M]  |
| 7 | a) Enumerate the steps in the construction of CC pavement.                                                                                                                                                                                                                                                                                                                           | [6M]  |
|   | b) Write short notes on bituminous Carpet.                                                                                                                                                                                                                                                                                                                                           | [6M]  |
|   | c) Discuss mud portions.                                                                                                                                                                                                                                                                                                                                                             | [4M]  |

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**PART -A**

- 1 a) Explain how the National Transport policy committee connected with road development. [3M]
- b) What are the factors that influence Right of way? [4M]
- c) Write short note on manual counts in traffic volume study? [4M]
- d) Discuss the influence of  $c$  and  $\Phi$  in triaxial test? [3M]
- e) What is meant by Repetition of loads? [4M]
- f) What are the factors considered to evaluate the foundation stability? [4M]

**PART -B**

- 2 a) What are the objectives of road development vision 2021? [4M]
- b) What are the factors affecting alignment? [8M]
- c) What are the steps involved in a new highway project? [4M]
- 3 a) Explain briefly about 'PIEV' theory. [4M]
- b) How the attainment of super elevation can be done? Describe briefly. [8M]
- c) Calculate the safe overturning sight distance for a design speed of 96 kmph. Assume all other data suitably. [4M]
- 4 a) Explain the level of service concept while deciding the design capacity of a road? [8M]
- b) Explain various measures that may be taken to prevent accidents. [8M]
- 5 a) Where do Pensky-Martens closed cup apparatus used? Explain the test procedure. [4M]
- b) Describe the steps involved in bituminous mix design. [12M]
- 6 a) Enumerate the various methods of flexible pavement design. Briefly indicate the basis of design in each case? [8M]
- b) Briefly outline IRC recommendations for determining the thickness of CC pavement. [8M]
- 7 a) What are the problems in the construction of high embankments over weak foundation soils? How are the various problems dealt with? [6M]
- b) Write short note on Surface dressing? [6M]
- c) Discuss briefly the importance of highway maintenance. [4M]

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