

**II B. Tech II Semester Regular Examinations, April - 2018**  
**TRANSPORTATION ENGINEERING-I**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

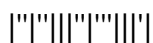
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**

**PART -A**

1. a) Enlist the requirements of a highway alignment. (2M)
- b) Explain briefly the recommendations of Jayakar Committee. (3M)
- c) How equivalent single wheel load influence the design of pavement? (2M)
- d) Describe the Mohr circle affect on unconfined compression test. (2M)
- e) Write short note on manual counts in traffic volume study? (3M)
- f) Evaluate grain size analysis on highway materials. (2M)

**PART -B**

2. a) Discuss briefly about the objectives of highway planning. (5M)
- b) Write down the classification of roads by Nagpur road plan. (5M)
- c) What is meant by Reconnaissance? (4M)
3. a) Write a short note on setting out of a transition curve. (7M)
- b) While aligning a highway in a built up area, it was necessary to provide a horizontal circular curve of radius 450 m. The design speed is 105 Kmph, the length of wheel base is 12m and the pavement width is 20m. Design super elevation, extra widening and length of transition curve. (7M)
4. a) How do you determine the flakiness index of road aggregates? What are the prescribed limits of flakiness index for the road aggregates given by IRC? (7M)
- b) What are the different tests to be organized on bitumen sample and explain how the test results are used for selecting as binding material in road construction? (7M)
5. a) What are the various types of flexible pavement failures? Explain briefly. (7M)
- b) What are requirements of filler and sealer materials for using them in the construction of CC pavements? (7M)
6. a) Write a note on the common methods of on-street parking (7M)
- b) What are the functions of traffic signs? (7M)
7. a) Explain with neat sketches about the expansion and contractions joints. (7M)
- b) Write a short note on maintenance management system. (7M)



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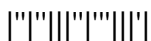
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**PART -A**

1. a) Write a short note on Indian Road Congress. (2M)
- b) Discuss thirtieth highest hourly volume (3M)
- c) Differentiate between Parking Index and Parking Turnover. (2M)
- d) What are the desirable properties of bitumen (2M)
- e) What are the functions of the various layers of a flexible pavement? (3M)
- f) How the excavation is done in highway construction? (2M)

**PART -B**

2. a) What are the objectives of road development vision 2021? (5M)
- b) What are the factors affecting alignment? (5M)
- c) What are the steps involved in a new highway project? (4M)
3. a) Explain the elements of highway geometric design (7M)
- b) For a highway with design speed of 100kmph, determine the safe OSD (assume acceleration as  $0.50 \text{ m/s}^2$ , and reaction time =2.0s). (7M)
4. a) Write a note on types of traffic signs (7M)
- b) Explain about types of road markings (7M)
5. a) What are the variations in temperature that generally effect the pavement? (7M)
- b) Discuss the Westergaard's concept of temperature stresses. (7M)
6. a) Elaborate on the various approaches of flexible pavement design. (7M)
- b) Calculate the spacing between contraction joints for a two lane 250mm thick concrete road having 3.5m wide slab. Unit weight of concrete =  $24 \text{ kN/m}^3$ . Ultimate stress in tension = 0.16MPa. Coefficients of friction at interface = 1.5, and the factor of safety = 2. Also calculate the spacing between expansion joints, if the increase in temperature is 200C, the expansion joint gap is 24mm and the thermal coefficient =  $10 \times 10^{-6}$  per 0C. (7M)
7. a) Enumerate the steps in the construction of CC pavement. (5M)
- b) Write short notes on bituminous Carpet. (5M)
- c) Discuss mud portions. (4M)



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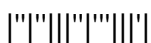
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**PART -A**

1. a) What are the obligatory points in alignment? (2M)
- b) Define the overtaking sight distance. (3M)
- c) Design the rate of super elevation for a horizontal highway curve of a radius 500m and speed 80 Kmph . (2M)
- d) Define the term traffic capacity and traffic density. (2M)
- e) Define the contact pressure. (3M)
- f) Explain the term warping down (2M)

**PART -B**

2. a) Write the difference between Tresaguet and Telford constructions. (7M)
- b) Write the comparison of first 20-year road plan and second 20-year road plan. (7M)
3. Write the objects of chamber? Discuss the factors on which the amount of chamber to be provided depends specify the recommended ranges of chamber for different types of roads. (14M)
4. Explain various types of traffic accidents? Discuss the method of analyzing the speed of vehicle involved in the accident. (14M)
5. a) Discuss the suitability of the soil as a sub grade material. (7M)
- b) Explain CBR and the test procedure for laboratory test (7M)
6. a) What are the various factors to be considered in pavement design? (7M)
- b) Explain the design considerations for rigid pavements. (7M)
7. Explain the construction of earth roads and discuss the advantages and limitations of earth roads. (14M)



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**PART -A**

1. a) What are steps involved in survey for highway. (2M)
- b) Define the kerb and list out the various types of kerbs. (3M)
- c) Define the term "PCU" and what are the factors affecting PCU values. (2M)
- d) A bus has a wheel base of 6.5 m what is the off tracking while negotiating a curved path with a mean radius 56m. (2M)
- e) Write the difference between inflation pressure and type pressure. (3M)
- f) Write short note on seal coat. (2M)

**PART -B**

2. What are the various plans to be prepared after the planning surveys are carried out. (14M)
3. a) Explain super elevation? What are the factors on which the design of super elevation depends? (7M)
- b) Calculate SSD on a highway at a descending gradient of 4% for a design speed of 100Kmph. Take total reaction time 2.5 and coefficient of friction as 0.4. (7M)
4. What is traffic islands and briefly explain the different types of traffic islands with neat sketch. (14M)
5. a) List out the different types of cutback when on cutback bitumen? (7M)
- b) Discuss in brief the tests carried out on cutback bitumen. (7M)
6. Explain the CBR method of pavement design. How is this method useful to determine thickness of component layers? (14M)
7. a) Discuss briefly the importance of highway maintenance. (7M)
- b) What are the various types of failures in flexible pavement? Explain causes. (7M)

