

6E6035

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6E 6035

B.Tech.VI Semester(Main/Back) Examination, May-June 2015.

Civil Engineering

6CE5A Transportation Engineering -I

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

**Instructions to Candidates:**

Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

**Unit - I**

1. a) Explain the role of transportation in the economic and social activities of the country. (6)
- b) Define the highway alignment. Explain the requirement of an ideal highway alignment . Which factors control the alignment of roads? (10)

**OR**

1. a) What are the significant recommendations of Jaykar committee report? How this helped in road development in India? (6)
- b) Calculate the total length of NH,SH,MDR needed in a district as per second 20-Year road development plan. The data collected from the district are given below - (10)

Area of a district = 10800 km<sup>2</sup>Developed and agricultural area = 4100 km<sup>2</sup>Undeveloped area = 2300km<sup>2</sup>

Population Range	Number of Towns
Less than 500	450
500-1000	320
1000-2000	120
2000-5000	110

5000-10,000	35
10,000-20,000	20
20,000-50,000	10
50,000-1,00,000	6
>1,00,000	2

**Unit - II**

2. a) What are the various tests for Judging the suitability of road stones? Explain the tests which is used to evaluate the toughness of stone aggregate. (8)
- b) Explain the desirable properties of bitumen. Compare tar and Bitumen. (8)

**OR**

2. a) Specify the material required for construction of WBM roads. What are the uses and limitations of WBM roads. (10)
- b) What are the different types of joints which are used in construction of cement concrete pavement? (6)

**Unit - III**

3. a) Calculate the length of transition curve and the shift using following data-  
Design speed = 80kmph and radius of circular curve is 300 metre. Allowable rate of introduction of super-elevation is 1 in 150.  
Pavement width including extra widening = 7.5 metre. (8)
- b) Define the camber and what is the objective of camber. Discuss the factors on which the amount of camber to be provided depends. What are the recommended range of camber for different types of pavement surfaces? (8)

**OR**

3. a) A state highway passing through a rolling terrain has a horizontal curve of radius equal to the ruling minimum radius. If the design speed is 100kmph.
- i) Calculate minimum sight distance, super elevation, extrawidening and length of transition curve. (10)
- ii) Specify the minimum set-back distance from the centre line of the two lane highway on the inner side of the curve upto which the building etc. obstructing vision should not be constructed so that intermediate sight distance is available throughout the circular curve. Assume the length of circular curve greater than sight distance.
- b) Draw the typical cross-section of major district road in embankment and national highway is cutting including width of pavement, roadway and land. (6)



**Unit - IV**

4. a) Explain the various types of intersections with neat sketches. What are the advantages and limitations of unchannelized and channelized intersection in particular reference to traffic condition in India? (12)
- b) Define passenger car unit. What are the factors which affects the PCU values? (4)

**OR**

4. a) The average normal flow of traffic on reads A and B during design period are 400 and 250 pcu per hour, the saturations flow values on these roads are estimated as 1250 and 1000 pcu per hour respectively the all real time required for pedestrian crossing is 12 secs. Design two phase traffic signal by webster's method. (8)
- b) Write a short notes on the following
- i) Trip distribution
  - ii) Kerb parking
  - iii) Off street parking
  - iv) Model split. (8)

**Unit - V**

5. a) What is the importance of hill road drainage?With the aid of neat sketches, show the surface drainage system for effective drainage and disposal of water (8)
- b) Explain ESWL and what is the concept in determination of the equivalent wheel lead? (8)

**OR**

5. a) What are the various methods of flexible pavement design. Explain group index of pavement design. What are the limitations of this method. (8)
- b) Calculate the stresses at interior edge and corner regions of a cement concrete pavement using Westergaard's stress equations. Use the following of data :-  
Wheel load = 5100kg.  
Modulus of elasticity of cement concrete =  $3 \times 10^5$  kg/cm<sup>2</sup>  
Pavement thickness = 18 cm,  
Poisson's ratio of concrete = 0.15  
Modulus of subgrade reaction = 8.5 kg/cm<sup>2</sup> (8)  
Radius of contact area = 15cm.