

D 30955

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Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION  
OCTOBER 2012

CE 09 501—TRANSPORTATION ENGINEERING—I

(2009 Scheme)

Time : Three Hours

Maximum : 70 Marks

*Answer all questions from Part A.  
Answer any four questions from Part B.  
Answer all questions from Part C.  
Assume suitable data wherever necessary.*

**Part A**

1. What are the requirements of an ideal alignment ?
2. What are the factors on which superelevation depend on ?
3. Differentiate between time mean speed and space mean speed.
4. Explain Net Present value method of economic analysis.
5. What are the different airport classification according to ICAO ?

(5 × 2 = 10 marks)

**Part B**

1. State the IRC specifications for width of carriage way for various classes of roads.
2. How do you fix the length of transition curves in highway geometric design ?
3. What are the objectives of signal co-ordination ?
4. Explain the various uses of cumulative speed distribution curve.
5. Explain B/C method of economic analysis.
6. What are the factors affecting airport capacity ?

(4 × 5 = 20 marks)

**Part C**

1. Calculate the maximum allowable speed on a horizontal curve of radius 350 m, if the maximum allowable values of lateral co-efficient of friction is 0.15 and rate of superelevation is 0.07.

(10 marks)

Or

2. (a) Derive an expression for stopping sight distance on a highway with a design speed of V kph.  
(4 marks)  
(b) An ascending gradient of 1 in 50 meets a descending gradient of 1 in 80. Determine the length of summit curve to provide  
(i) ISD. (ii) OSD for a design speed of 80 kph. Assume all other data.

(6 marks)

Turn over

3. What are the various types of stresses in rigid pavements ? Explain. (10 marks)

Or

4. (a) Why are parking surveys necessary ? Mention methods adopted for parking surveys. (6 marks)
- (b) What do you understand by optimum cycle length in signal design ? Explain. (4 marks)
5. Find the stresses at interior, edge and corner regions of a cement concrete pavements using Westergaard's stress equations.

Given, wheel load = 4100 kg,

E for concrete =  $3 \times 10^5$  kg/cm<sup>2</sup>,

Pavement thickness = 15 cm

Poisson's ratio for concrete = 0.15

Modulus of subgrade reaction = 3 kg/cm<sup>3</sup>

Radius of contact area = 15 cm.

(10 marks)

Or

6. Design a flexible pavement by CBR method for 1300 commercial vehicles per day with 8% growth rate. Different pavement materials available are :
- (a) Subgrade soil with CBR 3.5%.
- (b) Sandy soil with CBR 10%.
- (c) Stabilized soil with CBR 20%.
- (d) Broken stone with CBR 90%.
- (e) Bituminous concrete for surfacing minimum 6 cm thick.

Assume a period of construction as 3 years.

(10 marks)

7. (a) What are the different systems of aircraft parking ? Explain the suitability of each system. (5 marks)
- (b) Distinguish between :
- (i) Apron and Hangar.
- (ii) Approach Zone and Turning Zone.

(5 marks)

Or

8. (a) Explain how turning radius of a taxiway designed ? (5 marks)
- (b) Sketch the details of runway marking. (5 marks)