| Reg. No. : | 88 | 50 |
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| Question Paper Code: 50285 | | |

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Fifth Semester
Civil Engineering
CE 6504 – HIGHWAY ENGINEERING

(Regulations 2013)

Answer ALL questions.
Use Table and Chart.

PART - A

(10×2=20 Marks)

Maximum: 100 Marks

- 1. What are the objectives of highway planning?
- 2. Write the classification of roads.

Time: Three Hours

- 3. State the merit and demerit of parabolic camber.
- Find the super elevation on a horizontal circular curve of 150 m radius for design speed of 65Kmph with a coefficient of friction 0.15.
- 5. What are the various factors considered for the design of pavements?
- 6. Define: Rigidity Factor.
- 7. Define 'Flakiness index'.
- 8. What are the desirable properties of soil as highway material?
- 9. Write down the works under routine repairs.
- 10. What is meant by Mud pumping?

PART - B

(5×13=65 Marks)

11. a) Explain the classification of Urban roads with neat sketches.

(OR)

b) Elaborate the factors affecting the geometric design of highway.

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12. a) Calculate the safe OSD for a design speed of 90 Kmph. Take reaction time of driver as 2.5 seconds and acceleration of overtaking vehicle as 2.5 kmph/sec. Draw OSD zone.

- b) Calculate the length of the transition curve with the following data Design Speed = 70 Kmph, Radius of circular curve = 250m Allowable rate of introduction of super elevation = 1 in 150. Pavement width including extrawidth = 7.5m.
- 13. a) Explain any two methods of flexible pavement design.

b) Calculate the stresses at interior, edge and corner region of cement concrete pavement using Westergaard's equation. Use the following data.

Wheel Load = 5200 kg

Pavement Thickness = 20cm

Poisson's ratio of concrete = 0.15

Subgrade Modulus = 6kg/cm³

Young's Modulus of cement concrete = 3×10⁵ kg/cm²

Radius of contact area = 15cm

14. a) Explain any two tests on road aggregates.

- b) Explain any two tests on bitumen.
- 15. a) Discuss briefly the different types of failures of rigid pavements.

(OR)

b) Evaluate any three non destructive testing methods of pavement deflection.

PART – C (1×15=15 Marks)

16. a) A cement concrete pavement has a thickness of 18 cm and has two lanes of 7.2m with a longitudinal joint along the centre. Design the dimension and spacing of tie bar using the following details.

Allowable working stress in tension = 1400 kg/cm²

Unit weight of concrete = 2400 kg/m³

Coefficient of friction = 1.5

Allowable bending stress in deformed bars in concrete = 2.5 kg/cm².

(OR)

b) Explain the application of geotextiles and geomembrane in road construction.