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07/11/17 FN

Question Paper Code : 50285

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Fifth Semester

Civil Engineering

CE 6504 – HIGHWAY ENGINEERING

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

Use Table and Chart.

PART – A

(10×2=20 Marks)

1. What are the objectives of highway planning ?
2. Write the classification of roads.
3. State the merit and demerit of parabolic camber.
4. 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.



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

(OR)

- b) Calculate the length of the transition curve with the following data
Design Speed = 70 Km/h, 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.

(OR)

- 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 = 6 kg/cm^3

Young's Modulus of cement concrete = $3 \times 10^5 \text{ kg/cm}^2$

Radius of contact area = 15cm

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

(OR)

- 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/cm^2

Unit weight of concrete = 2400 kg/m^3

Coefficient of friction = 1.5

Allowable bending stress in deformed bars in concrete = 2.5 kg/cm^2 .

(OR)

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