Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40803

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fifth Semester
Civil Engineering
CE 6504 – HIGHWAY ENGINEERING
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

(Relevant IRC codes are allowed)
Answer ALL questions.

PART – A (10×2=20 Marks)

1. Mention any two recommendations of Jayakar Committee.
2. What are the objectives of the highway planning ?
3. What is meant by widening of pavement on horizontal curves ?
4. Define camber.
5. What are dowel bars ?
6. Define modulus of subgrade reaction.
7. Define Elongation Index.
8. Differentiate between cut-back bitumen and bitumen emulsions.
9. Differentiate between Spalling and traverse crack.
10. What is meant by mud pumping ?

PART – B (5×13=65 Marks)

11. a) Explain the requirements of ideal highway alignment and the factors controlling the alignment. (13)

(OR)

b) i) Describe the classification of Highways based on location and function. (4)

ii) Write short notes on i) Indian Road Congress ii) Central Road Research Institute (CRRI) and iii) Highway Research Board. (3+3+3=9)

12. a) i) Describe briefly about gradients and its types. (7)

ii) Explain the factors influencing the geometric design of hill roads. (6)

(OR)

b) i) Find the rate of super elevation on a horizontal curve having a radius of curvature of 90 m. The design speed is 50 kmph and assume f = 0.15. (4)

ii) Explain in detail about sight distance and its types. (9)

13. a) i) Compare flexible and Rigid pavements. (5)

ii) Explain the CBR method of design of flexible pavements. (8)

(OR)

b) i) Describe about Equivalent single wheel load. (5)

ii) Calculate the stresses at corner, edge and interior regions of a cement concrete pavement by applying Westergaard's equations with the following particulars :

P = Wheel load=4100 kg

h = Slab thickness = 15 cm

a = Radius of wheel load distribution = 15cm.

E = Modulus of elasticity of concrete = 2.1×10^5 kg/cm^2.

μ = Poisson's ratio for concrete = 0.15.

K = Modulus of subgrade reaction = 3 kg/cm^3. (8)

14. a) i) What is Geotextiles ? Describe the functions of geotextiles in road construction. (7)

ii) Discuss the requirements of good highway drainage system. (6)

(OR)

b) Explain the penetration test, viscosity test, ductility test and softening point test for bitumen. (13)

15. a) i) Describe about Mud jacking. (3)

ii) Explain the different types of failure encountered in flexible pavements. (10)

(OR)

b) i) Describe the objectives of pavement evaluation. (4)

ii) Discuss briefly the different types of failures in rigid pavement. (9)

PART – C (1×15=15 Marks)

16. a) Describe the objectives of the engineering surveys and explain the engineering surveys conducted for highway alignment.

(OR)

b) Explain in detail about the Crushing test, Abrasion test, Impact test and Soundness test on the aggregates used for highway road construction.