Reg. No. : ☐☐☐☐☐☐☐☐☐☐

Question Paper Code: 53014

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Third Semester

Civil Engineering

15UCE304 - HIGHWAY AND RAILWAY ENGINEERING

(Regulation 2015)

(Use of code books IRC 37-2001 and IRC 58 2002 are permitted)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The Central road fund was formed in the year

    (a) 1982   (b) 1985   (c) 1876   (d) 1929

2. The OSD is the distance measured along the centre of the road which a driver with his eye level at

    (a) 1.25m   (b) 1.0m   (c) 1.2m   (d) 1.3m

3. The triaxial compression test is to determine the

    (a) Shear strength of the soil   (b) Shear strength of the aggregate
    (c) Bearing capacity of the soil   (d) Bearing capacity of the aggregate

4. Design of CC pavement is to be carried out for a life of

    (a) 100 years   (b) 50 years   (c) 30 years   (d) 60 years

5. The total compacted thickness of subgrade for all National and State highways is

    (a) 250 mm   (b) 500mm   (c) 400mm   (d) 100mm

6. For the construction of CC pavements, the target mean compressive strength of CC mix at 28 days is

    (a) 3000 kg/cm^2 (b) 2000 kg/cm^2 (c) 4500 kg/cm^2 (d) 4000kg/cm^2

7. The size of standard gauge (B.G.) width is

    (a) 0.762m   (b) 1.0m   (c) 1.67m   (d) 0.610m

8. Generally, the wheels are coned at a slope of

    (a) 1 in 40   (b) 1 in 20   (c) 1 in 30   (d) 1 in 10

9. The shift in widening of gauges on curve is calculated by using the formula

    (a) $L^2/24R$ (b) $L^3/34R$ (c) $L^2/34R$ (d) $L^3/24R$

10. The opposite wheel flanges are guides by use of

    (a) Crossings   (b) Check rails   (c) Pointing   (d) Wing rails

PART - B (5 x 2 = 10 Marks)

11. How will you classify the urban roads?

12. What are the components of typical flexible pavement structure?

13. Write the various causes of pavement deterioration.

14. Define the term "Super elevation".

15. Classify Crossings on the basis of shape.

PART - C (5 x 16 = 80 Marks)

16. (a) Discuss in detail about the focus of various twenty year plans for a highway development in India. (16)

Or

    (b) (i) Describe the various factors to be considered in deciding the sight distance at intersections. (10)

        (ii) The design speed of highway is 80 kmph. There is a horizontal curve of radius 200 m on a certain location. Calculate the super elevation needed to maintain this speed. If the maximum super-elevation of 0.07 is not to be exceeded, calculate the maximum allowable speed on this curve as it is not possible to increase the radius. The safe limit of transverse coefficient of friction is 0.15. (6)

17. (a) (i) Outline any four tests conducted to test the suitability of bitumen for road construction. (10)

        (ii) List the various factors to be considered in pavement design. (6)

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Or

(b) (i) Explain the CBR method of pavement design. How is this method useful to determine thickness of component layers. (10)

(ii) Report the advantages and limitations of CBR method of pavement design. (6)

18. (a) (i) Distinguish the alternate bay and continuous bay methods of construction of cement concrete roads. (10)

(ii) Mention the various types of failure in flexible pavements. (6)

Or

(b) Summarize the material required, plants and equipments and construction steps followed in laying of the bituminous concrete pavement. (16)

19. (a) What is creep? Discuss the theories propounded to explain probable effects of creep. (16)

Or

(b) Elaborately discuss the various advantages of railways. (16)

20. (a) State the methods of plate laying and explain the method of plate laying widely used in India. (16)

Or

(b) (i) Classify signals. List the various types of maintenance. (8)

(ii) Write the requirement of railway stations. (8)

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