Reg. No. :

Question Paper Code: 41143

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Fourth Semester

Civil Engineering

14UCE403 - HIGHWAY ENGINEERING

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. IRC was setup in the year

    (a) 1930   (b) 1934   (c) 1940   (d) 1943

2. Border Roads Organisation for hilly regions, was formed in

    (a) 1947   (b) 1954   (c) 1958   (d) 1960

3. Carriageway width for a single lane is

    (a) 3 m   (b) 4 m   (c) 3.8 m   (d) 2.5 m

4. The type of transition curves generally provided on hill roads, is

    (a) circular   (b) cubic parabola
    (c) Lemniscate   (d) spiral

5. Design of flexible pavements is based on

    (a) mathematical analysis
    (b) empirical formulae
    (c) compromise of pure theory and pure empirical formula
    (d) none of these

6. AS per IRC, maximum load of axle of a vehicle should not exceed

    (a) 8165 kg (b) 9500 kg (c) 800 kg (d) 7500 kg

7. In water bound macadam roads, binding material, is

    (a) sand   (b) stone dust   (c) cement   (d) brick dust

8. Aggregate impact test is used to evaluate

    (a) percentage wear   (b) Toughness
    (c) Crushing strength   (d) water absorption percentage

9. Reflection cracking is observed in

    (a) Flexible pavement
    (b) Rigid pavement
    (c) Rigid overlay flexible pavement
    (d) Bituminous overlay over cement concrete pavement

10. Deflection measurement is done by

    (a) speedometer   (b) Benkelman Beam
    (c) Thickness gauge   (d) Deflecto meter

PART - B (5 x 2 = 10 Marks)

11. List out the factors influencing highway alignment.

12. Define stopping sight distance.

13. Mention the factors influencing design of rigid pavements.

14. What are the desirable properties of Bitumen?

15. Define skid resistance.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the various conventional engineering surveys for highway alignment.   (16)

Or

    (b) (i) Describe the factors governing highway alignment.   (8)

        (ii) Write brief note on highway development in India.   (8)

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17. (a) The design speed on a road with curve of radius 400m is 90 kmph. The coefficient of friction is 0.15. Calculate :

   (i) super Elevation for full lateral friction

   (ii) coefficient of friction when no super elevation is provided

   (iii) Super election for equal pressure at inner and outer wheels   (16)

Or

   (b) Explain the different types of gradients.   (16)

18. (a) Discuss the factors affecting design of flexible pavements.   (16)

Or

   (b) Discuss the IRC Recommendations for design of cement concrete pavements. (16)

19. (a) Explain the various tests conducted on bitumen.   (16)

Or

   (b) (i) Explain different materials used for polymer modified bitumen.   (8)

   (ii) Explain construction of cement concrete road.   (8)

20. (a) Explain various types of failures in Rigid pavements.   (16)

Or

   (b) Discuss the various steps in highway project formulation.   (16)

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