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

Question Paper Code: 41143

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

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. The road foundation for modern highways construction, was developed by

   (a) tresguet and telford simultaneously (b) telford
   (c) telford and macadam simultaneously (d) macadam

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

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

3. To calculate the minimum value of ruling radius of horizontal curves in plains, the design speed is given by

   (a) 8 *kmph* (b) 12 *kmph* (c) 16 *kmph* (d) 20 *kmph*

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. The thickness of a pavement may be reduced considerably by

(a) compaction of soil (b) stabilisation of soil
(c) drainage of soil (d) all the above

7. Percentage of free carbon in bitumen is

(a) more than that in tar (b) less than that in tar
(c) equal to that in tar (d) none of the above

8. The wall constructed for the stability of an excavated portion of a road on the hill side, is known as

(a) retaining wall (b)breast wall
(c) parapet wall (d) all the above

9. Minimum thickness of a layer of fine sand required to cut off capillary rise of water completely, should be

(a) 40 cm (b) 52 cm (c) 64 cm (d) 76 cm

10. The maximum spacing of contraction joints in rigid pavements is

(a) 2.5 *m* (b) 3.5 *m* (c) 4.5 *m* (d) 5.5*m*

PART - B (5 x 2 = 10 Marks)

11. Define Kerb. What is its purpose?

12. Write PIEV theory.

13. List the components of flexible pavement.

14. What are the functions of geo-textiles?

15. What is skid resistance? What are the various factors governing skid resistance?

PART - C (5 x 16 = 80 Marks)

16. (a) Explain in detail the various investigations and surveys to be undertaken in proper sequence for the successful planning, estimation and execution of a major highway project. (16)

Or

(b) Describe the history of developments of Highway in India based on Jayakar committee and twenty year road development plan. (16)

17. (a) Explain the points to be considered for planning of hair pin bends in hill roads. (16)

Or

(b) The design speed of a high way of 10 *kmh*. there is a horizontal curve of radius 200 *m* on a certain locality. Calculate the super elevation receded to maintain this speed. If maximum super elevation allowable speed on this horizontal curve as it is not possible to increase the radius. The safe limit transverse co-efficient of friction is 0.15. (16)

18. (a) Explain the CBR method of pavement design. Discuss the limitations of this method. (16)

Or

(b) (i) Design the flexible pavement for the construction of a new highway with the following data:

(1) Category of road : four lane dual carriageway
(2) Number of commercial vehicles in the year : 5600 commercial vehicles completion of construction per day per direction
(3) Annual growth rate of commercial vehicles : 8%
(4) Design life : 15 years
(5) Design CBR of sub-grade soil : 5% (8)

(ii) Compare rigid and flexible pavements. (8)

19. (a) List the types of bituminous roads. Explain the bituminous macadam type of road construction. (16)

Or

(b) (i) Explain the various sub surface drainage system with neat sketches. (8)

(ii) Explain the construction procedure of cement concrete road as per IRC specification. (8)

20. (a) Briefly explain the maintenance management system? (16)

Or

(b) Explain the various surface defects in flexible pavements. Also mention their causes. (16)

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