Reg. No. :

Question Paper Code : X10252

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2021

Sixth Semester

Civil Engineering

CE 8604 – HIGHWAY ENGINEERING

(Regulations 2017)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   **(10×2=20 Marks)**

1. What is the importance of soil in highways ?

2. List the factors influencing highway alignment.

3. While aligning a hill road with a ruling gradient of 7 percent, a horizontal curve of radius 60 m is encountered. Find the compensated gradient at the curve.

4. What are hair pin bends ? Explain exceptional gradient.

5. Draw a neat diagram showing the components of flexible pavement.

6. What is the design principle of rigid pavement ?

7. List the various tests to be carried out on coarse aggregates.

8. What is polymer modified bitumen ? Explain.

9. What is bump integrator ? Mention values for unevenness index as per IRC guidelines.

10. Differentiate between Present Serviceability Rating and Present Serviceability Index.

PART – B   **(5×13=65 Marks)**

11. a) Explain the role of transportation in rural development in India.

          (OR)

    b) Draw a typical cross section of rural road and explain how the carriageway width is calculated.

12. a) The speeds of overtaking and overtaken vehicles are 70 and 40 kmph, respectively on a two-way traffic road. If the acceleration of overtaking vehicle is 0.99 m/sec^2.

    a) Calculate safe overtaking sight distance.

    b) Mention the minimum length of overtaking zone and

    c) Draw a neat sketch of the overtaking zone and show the positions of the sign posts.

(OR)

  b) Calculate the length of transition curve using the following data :

Design speed = 75 kmph

Radius of circular curve = 290 m

Pavement width = 7.0 m

Terrain = Hilly

13. a) Explain the design principle of Flexible pavement.

(OR)

  b) With a neat diagram explain the role of pavement components of rigid pavement.

14. a) Explain CBR test method with the help of diagram and equations.

(OR)

  b) What is combined flakiness and elongation index test ? Explain how to find out combined flakiness and elongation value.

15. a) List the various pavement distress in flexible pavement and explain each of them.

(OR)

  b) What is pavement management system ? Explain how pavement evaluation is done.

PART – C   **(1×15=15 Marks)**

16. a) A state highway passing through a rolling terrain (v = 80 kmph) has a horizontal curve of radius equal to the ruling minimum radius, calculate transition curve length and set back distance for intermediate sight distance. Assume coefficient of friction as 0.35 and number of lanes as 3.

(OR)

  b) Design a horizontal curve for a design speed of 100 kmph in a plane terrain; also calculate set back distance for overtaking sight distance. Assume rate of acceleration, a = 0.53 m/sec^2.

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