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

Question Paper Code: E3050

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2010

Fourth Semester

Civil Engineering

CE2255 — HIGHWAY ENGINEERING

(Regulation 2008)

Time: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A — (10 × 2 = 20 Marks)

1. State any two contributions made by Jayakar Committee for the road development in India.
2. Define ruling gradient and exceptional gradient.
3. What do you understand by non-passing sight distance?
4. Write down the requirements of an ideal transition curve.
5. How do you calculate the ESWL at given depth below the pavement for a dual wheel assembly?
6. What is radius of resisting section?
7. Define 'flaky aggregates'.
8. What is the purpose of applying tack coat in bituminous road construction?
9. When is overlay needed in pavements?
10. What is 'unevenness index'?

PART B — (5 × 16 = 80 Marks)

11. (a) (i) State and explain the economic factors influencing highway alignments. (8)

(ii) Briefly explain the role of MORTH and IRC in highway development. (8)

Or

(b) Compare the three "Twenty year road development plan" in India. Also discuss the merits of each one of them. (16)

12. (a) A valley curve is formed due to two gradients +2.5% and –1.75%. If the design speed of this highway is 80 kmph, determine the stopping sight distance and design the valley curve to fulfil both comfort and head light sight distance conditions.

Or

(b) What are the objectives of widening of road pavement at horizontal curves? Derive an expression for the extra widening.

13. (a) (i) State the limitations of CBR method of pavement design. (6)

(ii) Using the following data, design the flexible pavements layers (10)

CBR of the sub-grade soil = 5%

CBR of poorly graded gravel sub-base = 15%

CBR of WBM = 80%

Design life = 15 years

Annual rate of increase in the heavy vehicles = 7.5%

No. of heavy vehicles per day during last count = 200

No. of years between the year of completion and year of last count = 3 years.

Assume any other data found required.

Or

(b) (i) What are the objectives of joints in cement concrete pavement? Sketch the different types of joints used in pavement construction. Indicate the principle of design. (10)

(ii) Explain mud pumping. What are the causes for mud pumping and how it can be prevented? (6)

14. (a) Describe how impact value of aggregate and specific gravity of bitumen are found by experiment in laboratory? (16)

Or

(b) Explain the construction procedure of the following types of roads.

(i) Dense Bituminous Macadam. (8)

(ii) Bituminous Concrete. (8)

15. (a) Classify the different types of failures in flexible pavement and mention the important causes of each. (16)

Or

(b) (i) Explain the principle and uses of Benkelman Beam test. (6)

(ii) Describe the complete procedure of carrying out Benkelman Beam test to evaluate the pavement with model calculation. (10)
