Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 52772

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fifth Semester

Civil Engineering

CE 6504 — HIGHWAY ENGINEERING

(Regulation 2013)

(Common to PTCE 6504 – Highway Engineering for B.E.(Part-Time) Third Semester – Civil Engineering – Regulation – 2014)

Time : Three hours   Maximum : 100 marks

Use Relevant tables and charts of IRC 37-2001 /IRC 58-2002.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   How are roads classified in Nagpur plan?

2.   What are the recommendations of Jayakar Committee?

3.   What are the fundamental principles of alignment?

4.   What are the types of sight distance?

5.   Differentiate between rigid and flexible pavements in pavement design.

6.   Draw a typical rigid pavement with its vital components.

7.   How Geotextiles improve safety and stability of highway embankments?

8.   How adding up the waste plastics help in the improvement of bituminous pavements?

9.   Differentiate delamination and depression.

10. What are the causes of cracks?

PART B — (5 × 13 = 65 marks)

11. (a) Write shortly the significance of 'soil suitability analysis and road Ecology' in highway planning.

Or

(b) Write in brief the history of road development in India after independence.

12. (a) Explain the factors affecting sight distance.

Or

(b) The design speed of a highway is 80 kmph. There is a horizontal curve of radius 200 m on this road. If maximum super elevation of 1 in 15 is not to be exceeded, calculate the maximum allowable speed on the curve. Also determine the extra widening required and length of the spiral transition curve using the following data. Length of the wheel base = 6.1 m, Pavement width = 7.2 m and number of lanes = 2. Rate of introduction of super elevation is 1 in 200.

13. (a) Design the pavement for construction of a new two lane carriageway for design life 15 years using IRC method. The initial traffic in the year of completion in each direction is 150 CPVD and growth rate is 5%. Vehicle damage factor based on axle load survey = 2.5 std axle per commercial vehicle. Design CBR of subgrade soil = 4%.

Or

(b) Explain the IRC design procedure for rigid pavements.

14. (a) Explain the California bearing ratio test.

Or

(b) What are the modern construction materials used for the construction of pavements? Explain their characteristics and usage in detail.

15. (a) List any Eight cracks and defects in flexible pavements and describe their respective symptoms, possible causes and the treatment/repair for each defect.

Or

(b) Define Overlay and the procedure for design and construction of overlays.

PART C — (1 × 15 = 15 marks)

16. (a) Explain in brief the modern methods of laying highway alignment being adopted at present with its merits and demerits.

Or

(b) Write in detail the present status of highway drainage in Chennai city roads and list out the measures to be taken for effective removal of water from the pavement.