T 8091

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Fourth Semester

Civil Engineering

CE 1255 — HIGHWAY ENGINEERING

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Draw figures wherever required.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw a typical cross section of Macadam's method of road construction.

2. State the concept of on-going National Highway Development Programme commissioned in India in the year 2003.

3. Spell out the PIEV theory in the design of sight distance for highways.

4. Draw a typical cross section of a double lane National Highway and indicate widths of carriage way, shoulder and right of way.

5. Compare the design principles of flexible and rigid pavements.

6. Define the concept of CBR in highway design.

7. Draw a schematic diagram of any one urban road with provision for drainage.

8. What do you understand by bitumen S 90?

9. State the concept of any one method of pavement evaluation.

10. What is the cause potholes? How are they repaired?

PART B — (5 × 16 = 80 marks)

11. (a) Illustrate with neat sketches and explain, how any four obligatory poi control highway alignment.

Or

(b) Write short notes on the following :

(i) Indian Roads Congress

(ii) Central Road Research Institute

(iii) National Highway Authority of India

(iv) Ministry of Road Transport and Highways.

12. (a) (i) Derive an expression for the Stop Sight Distance (SSD) at plai and at slopes in highway engineering.

(ii) Calculate the SSD for a two lane road with two way traffic and single lane road with two way traffic given the following data :

- Design speed – 100 km/h
- Coefficient of friction – 0.35
- Reaction time of driver – 2.5 sec
- Descending gradient – 4%.

Or

(b) (i) Explain, in a sequential order, steps for practical design o superelevation.

(ii) At a section of a National Highway, due to site constraints, a radiu of curvature of only 250 m has to be provided. Design the superelevation. State whether the speed should be restricted.

efly explain the methodology suggested by IRC for the design of rigid vement.

Or

Design a flexible pavement in a hilly area with the following data :

Present traffic intensity – 350 vehicles / day

Design period – 8 years

Traffic growth rate – 7.5%

Lane distribution factor – 0.75

Vehicle Damage factor – 2.5

CBR value – 10%.

) How will you find the CBR of a subgrade soil in a laboratory? Give a critical appraisal of the CBR method of design of flexible pavement.

Or

b) Mention any four essential requirements of bitumen suitable for road making. Describe briefly any three prescribed laboratory tests to determine its suitability for road work.

(a) Discuss the following procedures for flexible pavement evaluation.

(i) Benkelman beam deflection studies

(ii) Estimation of unevenness index.

Or

(b) Write in a tabular statement symptoms, causes and treatments for any four failures of flexible pavements.

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