C 17904

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Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION JUNE 2011

CE 04 705 (D)—PAVEMENT DESIGN

(2004 admissions)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*
Missing data, if any, may suitably be assumed.
IRC codes are permitted.

I. (a) What are the desirable properties of subgrade soil ?

(b) Draw a sketch of a flexible pavement cross section and show the component parts. Enumerate the functions and importance of each component.

(c) Explain McLeod principle of pavement design.

(d) Explain the CBR method of pavement design. How is this useful to determine the thickness of component layers ?

(e) What are the design considerations of rigid pavements ?

(f) Compare the different methods of obtaining wheel load stresses at critical sections of rigid pavements.

(g) Discuss how overlays are designed for the existing flexible pavement.

(h) What are the general causes of pavement failures ?

(8 × 5 = 40 marks)

II. (a) Discuss the application of plate-bearing test carried out on a subgrade sol. (8 marks)

(b) What are the sources of moisture in a subgrade ? (7 marks)

Or

(c) What are the various factors to be considered in pavement design ? Discuss their significance. (7 marks)

(d) Explain in detail, the Marshal method of mix design. (8 marks)

III. (a) Calculate the deflection under a wheel load of 3175 kg. The tyre pressure is 5 kg/cm^2 and E of the pavement and subgrade is 250 kg/cm^2.

(8 marks)

(b) What do you understand by the load dispersal qualities of paving materials ? (7 marks)

Or

(c) A set of dual wheel assembly spaced 26 cm c/c and carry 2050 kg. each. The distance between the walls of tyres is 10 cm. Determine the ESWL for pavement thickness of 20, 25 and 30 m.

(8 marks)

(d) Discuss the affects of repeated load applications on pavements ? Explain the EWL factors for load for repetitions.

(7 marks)

IV. (a) Explain briefly, the structural and functional requirements of rigid pavements. (6 marks)

(b) Design the cement concrete pavement thickness, expansion and contraction joint spacing, dowel and tie bars for a wheel load of 5000 kg. (9 marks)

Or

(c) Explain the critical location of loading as regards wheel load stresses in a cement concrete pavement. (7 marks)

(d) Calculate the warping stresses at interior, edge and corner for a cement concrete pavement of thickness 20 cm, with transverse joints at 4.5 m spacing. Width of the slab us 3.5 m. For concrete, Modulus of elasticity $E = 3 \times 10^5$ kg/cm^2 and Poisson's ratio = k value of subgrade = 5 kg/cm^3. Temperature differential is 0.9°C/cm. Assume thermal coefficient for as concrete
10×10^{-6}/°C. (8 marks)

V. (a) Explain the plate load test in evaluating the structural behaviour of pavements. (8 marks)

(b) Explain the structural requirements of flexible and rigid pavements. (7 marks)

Or

(c) Explain the need for pavement evaluation. (8 marks)

(d) What is the need for an overlay ? Explain. (7 marks)

(4 × 15 = 60 marks)