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10CV833

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Pavement Design

Time: 3 hrs. Max. Marks:100

Note: *Answer FIVE full questions, selecting at least TWO PH questions from each part.*

PART A

1 a. With the help of sketches mention the various layers of flexible and rigid pavements. Write the functions of each layer. (10 Marks)

b. Distinguish between highway pavement and airfield pavement. (10 Marks)

2 a. State assumptions and limitations of Boussinesq's.theory. (Oh Marks)

b. Find the vertical stress distribution in a homogeneous pavement upto a depth of 60cms. Due to a bullock cart with wheel load 600kg on a vertical plane.

i) Along the line of action of load.

ii) 5cm away from the line of action of load. (14 Marks)

3 a. Explain the ESWL concept with neat figure. (08 Marks)

b. Find the ESWL by graphical method for a dual wheel load assembly with 2000kg on each wheel and tyre pressure of 6.5kg/km $^{-}$ if the centre to centre spacing between the wheels is 25cm. Consider the pavement thickness of 25cm and 45cm. (Use plain graph paper). (12 Marks)

4 a. Design the pavement section by triaxial leansus method using the following data:

Wheel load = 41kN

F-value of subgrade soil = 10N/mm^2

E-value of base course material = 40 nnr

H-value of wearing course = 100 Ntinm^2 which is 7.5cm thick

Traffic coefficient = 1.5

Rainfall coefficient = 0.9

Radius of contact area = 1.50mm

Design deflection = 2.5mm

Sketch the pavement section. (10 Marks)

h. Explain the design of flexible pavement by revised CBR method as per IRC quick lines. (10 Marks)

PART — B

5 a. Explain the f011owin:

i) Types and objectivesvfjoints in cement concrete pavement.

ii) Critical combination of stress in a CC pavement. (10 Marks)

b. A cement concrete pavement has a thickness of 20cms, has 2 lanes of slab width a 3.35m coefficient of friction between slab and subgrade = 1.5. Weight of slab = 480 kg/m'. Allowable working stress in steel — 1400 kg/km $^{-}$. Maximum permissible bond stress,

i) Plain bars, 17.5 kg/km^2.

ii) Deformed bars, 24 kg/cm^2. Design a tie — bar system. (10 Marks)

Important Note :

6 a. Explain different types of stresses due to wheel loads. **(10 Marks)**

b. Using the data given below, calculate the wheel load stresses at i) Interior ii) Edge and iii) Corner regions of a cement concrete pavement using Westergaard's stress equation. Also determine the probable location where the crack is likely to develop due to corner loading.

Wheel load P 5100kg, Ec = 3.0 x kg/cm', Pavement thickness, h = 18ems, Poisson's ratio of concrete = i.t= 0.15, K = 6.0 kg/km^3 and radius of contact area, a = 15cm. **(10 Marks)**

7 a. Explain Benkelman Beam deflection method. **(10 Marks)**

b. What are the requirements of airport pavement? **(10 Marks)**

8 a. Explain failures in flexible pavements. **(10 Marks)**

b. Write short notes on: i) Mud pumping ii) Structural cracks. **(10 Marks)**