CBCS SCHEME

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20CGT242

Second Semester M.Tech. Degree Examination, Dec.2023/Jan.2024
Pavement Analysis and Design

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. List and explain the desirable factor to be considered for the design of pavement. **(10 Marks)**

b. Bringout the points of difference between flexible and rigid pavement. **(10 Marks)**

OR

2 a. With a neat sketch, explain the component parts of flexible pavement. **(10 Marks)**

b. Bringout the difference between highway and airport pavement. **(10 Marks)**

Module-2

3 a. Explain Burmister (Layered systems) method. **(10 Marks)**

b. Calculate ESWL of a dual wheel assembly carrying 2004Kg each for pavement thickness 15,20 and 25cm, c/c tyre spacing is 27cm and distance between the walls of the tyre is 11cm. **(10 Marks)**

OR

4 a. Write a note on : i) Max. wheel load ii) contact pressure. **(08 Marks)**

b. Calculate the design repetitions for 15 year period equivalent to 2268Kg wheel load, if its mixed traffic in bolt directions is 1974 veh/day. The details of distribution and different wheel loads of commercial vehicles are given below :

Wheel load in Kg	% in total traffic volume
2268	25
2722	12
3175	09
3629	06
4082	04
4536	02
4990	01

(12 Marks)

Module-3

5 a. Write a note empirical, semi empirical and theoretical method and flexible pavement design. **(08 Marks)**

b. Write a note on CBR method of pavement design by cumulative standard Axle load. **(12 Marks)**

OR

6 a. Explain Mc-Leod method and flexible pavement design. **(06 Marks)**

b. Design the pavement section by triaxial test method using the following data :
Wheel load = 4100Kg, X = 1.5, Y = 0.9, Δ = 0.25cm, Radius of contract area = 15cm E_s = 100Kg/cm^2, E_b = 400Kg/cm^2, E-value and 7.5cm thick bituminous concrete = 1000Kg/cm^2. **(14 Marks)**

Module-4

7 a. Write a note on :
   i) Westergaard's modulus and subgrade reaction
   ii) Relative stiffness of slab to sub grade
   iii) Equivalent radius of resisting section **(10 Marks)**

   b. Write a note on Westergaard's concept for temperature stress. **(10 Marks)**

OR

8 a. Write note on :
   i) Frictional stresses
   ii) Combination of stresses **(10 Marks)**

   b. What are the considerations for design of rigid pavements? **(10 Marks)**

Module-5

9 a. With a neat sketch, explain the location of joints. Enumerate the functions of each joints in CC pavement. **(12 Marks)**

   b. The width and expansion joint gap is 2.5cm in a CC pavement. If the laying temperature is 10ºC and the max. Slab temperature in summer is 54ºC. Calculate the spacing between expansion joints. Assume coefficient of Thermal expansion of concrete as 10×10^{-6} per ºC. **(08 Marks)**

OR

10 a. Write a note on : i) CRCP ii) SFRC iii) ICBP. **(10 Marks)**

   b. The max. increase in terms is expected to be 26ºC after the construction of CC pavement. If the expansion gap is 2.2cm design the spacing between the expansion and contraction joints. Assume plain CC construction with $C = 10 \times 10^{-6}$ per ºC, unit weight = 2400Kg/cm^3, Allowable stress in tension during initial period of curing = 0.8Kg/cm^2 and the coefficient of friction of the interface = 1.4. **(10 Marks)**

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