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Total No. of Questions: [09]

Total No. of Printed Pages: 01

B. Tech Civil Engg. (Semester – 6th)
PAVEMENT DESIGN
Subject Code: BCIED1653
Paper ID: 19110732

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a) What do you mean by perpetual pavement?
- b) What are the various strength tests conducted for the evaluation of soil subgrade?
- c) What are advantages of group index method of design?
- d) What is warping stress?
- e) Define various critical load positions in slab.
- f) Define ESWL.
- g) What is radius of relative stiffness?
- h) How is the subgrade support(S) calculated in McLeod's method?
- i) What do you mean by perpetual pavement?
- j) Explain in brief ultrathin white topping.

Section – B

(5 marks each)

- Q2. How is thickness of flexible overlay on flexible pavements determined?
- Q3. What are various wheel loads factors to be considered in pavement design?
- Q4. Determine the thickness of concrete overlay as per the US Corp of Engineers method over an existing concrete pavement 20 cm thick which is in a good condition. It has been found that a new slab of 18 cm is needed. Also calculate the overlay thickness if the slab is badly cracked.
- Q5. Explain how the dimensions and spacing of tie bars are designed.
- Q6. Explain briefly the Marshall method of bituminous mix design.

Section – C

(10 marks each)

Q7. Write short notes on:

- a) Roller compacted concrete pavement
 - b) Types of overlays
- Q8. Calculate the stresses at interior, edge and corner of a cement concrete pavement by Westergaard's stress equation. Given, Modulus of elasticity of concrete = 3×10^5 kg/cm², Poisson's ratio of concrete = 0.15, thickness of concrete pavement = 20cm, Modulus of subgrade reaction = 8.5kg/cm², Wheel load = 4100kg, Radius of loaded area = 18cm.
- Q9. Describe step by step procedure for designing a rigid pavement with IRC Method.