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## ***B.Tech. Degree VII Semester Examination November 2019***

### **CE 15-1705 (E3) PAVEMENT ANALYSIS AND DESIGN (2015 Scheme)**

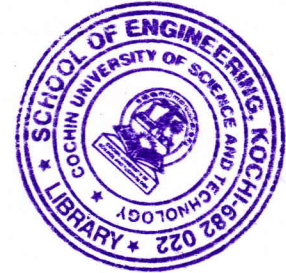
Time : 3 Hours

Maximum Marks : 60

#### **PART A (Answer *ALL* questions)**

(10 × 2 = 20)

- I. (a) What are the requirements of a pavement?
- (b) Write short notes on frost action in pavements?
- (c) Write short note on seal coat and tack coat?
- (d) What are the drawbacks of simple Boussineq's approach?
- (e) Explain Equivalent Single Wheel Load (ESWL)?
- (f) What is lane distribution factor?
- (g) What are the different critical load positions in pavement?
- (h) What is the importance of expansion joints in rigid pavement?
- (i) Explain the overlays in pavements?
- (j) What are the corrections required in Benkelman beam deflection value for pavement temperature?



#### **PART B**

(4 × 10 = 40)

- II. Explain various factors to be considered for the design of pavements in detail. (10)

#### **OR**

- III. (a) Explain the basic difference between flexible and rigid pavements? (4)
- (b) Draw a typical cross section of flexible pavement and explain the function of each component parts of flexible pavement? (6)

- IV. Plate Bearing Tests were conducted with a 75 cm diameter plate on soil subgrade and a granular base having 15 cm thickness. The stress noticed when the deflection was 0.25 cm on the subgrade soil was 0.07 MN/m<sup>2</sup>. On the base course, the same plate yielded 0.25 cm deflection under a stress of 0.14 MN/m<sup>2</sup>. Design the pavement for an allowable deflection of 0.5 cm, under a wheel load of 40 KN and a tyre pressure of 0.5 MN/m<sup>2</sup>. (10)

#### **OR**

- V. (a) The subgrade soil was analysed and gave the following data: (4)  
Soil portion passing through 74 micron sieve = 60%  
Liquid limit of soil = 45 %  
Plastic limit of soil = 30% Find the GI index?
- (b) Using McLeod method of design of pavement for a wheel load of 4100 kg with a tyre pressure 5 kg/cm<sup>2</sup>, a 30 cm diameter plate load test yielded a pressure of 2.5 kg/cm<sup>2</sup> after 10 repetition of load at 0.5 cm deflection. (6)

(P.T.O.)

- VI. (a) Determine the warping stresses at interior, edge and corner region in a 25 cm thick concrete pavement with transverse joints at 11 m interval and longitudinal joints at 3.6m interval, the modulus of subgrade reaction is  $2.9 \text{ kg/cm}^3$ , assume temperature differential for day condition to be  $0.6 \text{ }^\circ\text{C}$  per cm slab thickness. Assume radius of loaded area as 15 cm. The additional datas are  $e = 10 \times 10^{-6} \text{ }^\circ\text{C}$ ,  $E = 3 \times 10^5 \text{ kg/cm}^2$ . (6)
- (b) Explain the critical combinations of stress in rigid pavement. (4)
- OR**
- VII. (a) Explain the design of joints in cement concrete pavements? (5)
- (b) Explain the importance of dowel bars in rigid pavement? (5)
- VIII. Explain the structural evaluation of flexible pavement by Benkelman beam deflection method? (10)
- OR**
- IX. Explain different pavement distress in rigid and flexible pavements? (10)

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