B e Construction Engineering 4th Year Second Semester Examination 2018

Advanced Transportation Engineering   Full marks : 100   Time -3 hours

CO-1

Q-1. (a) (i) Explain the principle of computation of design traffic for low volume rural roads. (ii) Illustrate the design criteria of low volume rural roads in line with AASTHO guideline.   (15)

OR

(b) Determine the vehicle damage factor for laden heavy commercial vehicles, unladen heavy commercial vehicles, Laden medium heavy commercial vehicles and overloaded heavy commercial vehicles for rural road.   (15)

Q-2 (a) Design a cement concrete pavement for a rural road with a daily traffic of 150 vehicles per day on a subgrade with CBR of 4.0% i.e k= 35 MPa/ m . Assume temperature differential = 12^{0}C and Bradbury co-efficient as 0.625. Assume relevant data if required .   (20)

CO2

Q-3. (a)Explain the significance of AASTHO design equation for flexible pavement design. (15)

OR

Q-3. (b) Define structural number. Illustrate the principle for design of pavement using the concept of structural number. (15)

CO3

Q-4 (a) Find the spacing between contraction joints for a 3.75 m slab width with a thickness 0f 15 cm for both plain and RCC slab. The ultimate tensile stress values in concrete and steel are 1.62 kg/ cm^2 and 1200 kg/ cm^2. Coefficient of friction is 1.5 and the desired factor of safety is 2.0. Total reinforcement of 3.5 kg/ m^2 is provided and is equally distributed in both the direction.   (20)

OR

Q-4 (b) Design dowel bar length , spacing and capacity factor required of dowel system with the following data as per IRC specifications.   (20)

Design wheel load = 4100 kg

Design load transfer = 40%

Slab thickness = 22 cm

Joint width = 2.5 mm

Permissible flexural stress = 1400 kg/ cm²

Permissible shear stress in dowel bar = 1000 kg/ cm²

K value of sub base = 8 kg/ cm²/ cm

F_c= 100 kg/ cm²

Elastic modulus and poisons ratio of concrete are 30000 MPa and 0.15 respectively

AND

Q-5. Define and describe significance of different types of joints used in concrete pavement. Describe with neat sketches the specifications adopted for such joints as per IRC guideline. (10)

C04

Q-6. Determine the cycle time , green and amber time for each direction at the the intersection of Gariahat road and Rashbehari Avenue with following data.

Width of Gariahat road and Rashbehari Avenue is 14m and 10.5 m respectively. Gariahat road has an approach volume of 600 vehicles / hour with an approach speed of 50 kmph and peak hour directional split of traffic as 70: 30 where as Rashbehari Avenue has an approach volume of 500 vehicles / hour , with an approach speed of 45 kmph and peak hour directional split as 80: 20 (20)