Ref no EX/CON / PE/H/T/ 414B/2024

BE Construction Engineering 4th yr 1st Semester examination 2023

Advanced Transportation Engineering

Time : 3 Hours Full Marks-100

Answer any four questions .

Assume relevant data if required.

Q-1 (a) Determine the structural number of a bituminous pavement with top binder mix modulus as 3000 Mpa with a thickness of 150 mm followed by granular layer of 450 mm with elastic modulus of 250 Mpa resting on a clayey subgrade with 4% soaked CBR. (10)

(b) How an overlay thickness can be estimated on the top of an existing bituminous pavement using AASHTO method if present cross section of the pavement is known. (10)

© How the reliability of pavement design is ensured in AASHTO pavement design. (5)

Q-2 (a) (a) Design the thickness of ultra thin white topping for a city road with bituminous pavement in Kolkata.on a soft clay subgrade.

Given $K= 10\ kg/cm^3$, $\Delta t = 0.13\ ^0\ C / cm$ $\alpha= 10 \times 10^{-6}$ [15]

(b) Describe the role of different ingredients used in concrete for white toppings (10)

Q-3 (a) Define fatigue ratio and illustrate its significance in fatigue analysis of concrete pavement and overlay. (10)

(b) Define skid resistance . In which part of the road section , the significance of skid resistance is significant and why ? (8)

© Mention the factors which may influence skid resistance adversely. [7]

Q-4 (a) Define roughness index of a road pavement. How it is measured? Discuss the significance of roughness index in quality monitoring of road pavement .(10)

(b) Illustrate the basic principle of estimation of low volume rural road pavement thickness (10)

© Differentiate between ultrathin and thin white topping . (5)

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Q-5 (a) How the falling weight deflectometer (FWD) is used for measuring remaining life of road pavement . (5)

(b) Can the effect of different speed on pavement deflection be assessed using FWD. (5)

© Calculate radial tensile strain at the bottom of bituminous layer and vertical compressive strain on the top of soil subgrade under a standard dual wheel load for a road section as mentioned in Q-1(a) (15)

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