B. Tech.
(SEM VIII) External Examination, 2014
ADVANCE HIGHWAY ENGINEERING

Time: 3.00 Hours  [Total Marks: 100]

Note: (i) Attempt ALL questions.
      (ii) All Questions carry EQUAL marks.
      (iii) In case of numerical problems assume data whenever not provided.
      (iv) Don't write any think on the question paper except your roll no.

1. Attempt any FOUR of the following: 5x4=20
   a) Explain silent features of Lucknow road plan.
   b) Radius of relative stiffness
   c) Explain desirable properties of aggregate to be used in different types of pavement.
   d) Explain flexible and rigid pavements and bring out the points of difference.
   f) Explain ESWL and the concept in the determination of equivalent wheel load.

2. Attempt any FOUR of the following: 5x4=20
   a) Write short note on filler, emulsion, and additives?
   b) Write short note on vehicle operating cost?
   c) Explain the importance of highway maintenance.
   (1)
d) What is the requirement of a good highway drainage system?

e) Explain the mechanism of soil stabilization?

f) Write short note on cutbacks and modifies binders.

3. Attempt any TWO of the following: 10x2=20

a) Explain the mechanism of soil stabilization with their advantages and limitations.

b) Explain Bonkelman beam deflection method.

c) Calculate the stress at interior, edge and corner region of a cement concrete pavement using Westergards Equation. Use following data

Wheel load (P) = 5100kg

Modulus of elasticity of concrete (E) = 3.0x10^5 kg/cm^2

Pavement thickness, h=18cm

Poisson Ratio, \( \mu = 0.15 \)

Modulus of sub grade, \( k = 6.0\text{kg/cm}^2 \)

4. Attempt any TWO of the following: 10x2=20

a) Design the spacing of dowel bars at the expansion joints of C-C pavement of thickness 25cm with relative stiffness 80cm, for a design wheel load of 5000kg. Assume 40% design wheel load. Joint width is 2cm, permissible shear and flexural stress in dowel bar are 1000 and 1400kg/cm2 respectively and permissible bearing stress in CC is 100kg/cm2

b) Discuss the design details of dowel bars.

c) Explain the various types of failures in flexible and rigid pavement.

5. Attempt any TWO of the following: 10x2=20

a) Explain the CBR method of design recommended by the IRC.

b) Discuss the design details of tie bars.

c) Explain IRC method of design for rigid pavement.