PAPER CODE **ECE-031**

Roll No.

B. Tech.
(SEMESTER- VII) EXAMINATION, 2015-16
BRIDGE ENGINEERING

Time: 3 Hours   **Total Marks: 100**

Note: (i) Attempt ALL questions.
(ii) Marks are indicated against each question.
(iii) Assume any data suitably, if required.

1. Attempt any **FOUR** parts of the followings   **5x4=20**

   (a) What are the characteristics of ideal site for a bridge?

   (b) Derive the expression for economical span for a bridge?

   (c) The flood discharge under a bridge is 300 m^3/s. If the river bed has a deep layer of course sand, determine the maximum depth of scour under pier if silt factor is 1.5.

   (d) Differentiate between class AA and 70 R live loads as per IRC Code.

   (e) What are the limitations of Courbon's method?

   (f) What are the factors influencing the flood discharge in a river?

2. Attempt any **TWO** parts of the followings   **10x2=20**

   (a) Compute the effective width of dispersion for a 70 R tracked vehicle acting on a bridge slab simply supported on two opposite sides. Carriageway width two lane, span 6.0 m.

   (b) A deck slab supported by longitudinal and cross girders. Longitudinal girders placed 3.0 m c/c and cross girders at spacing of 3.5 m c/c. use Pigeaud's method and determine maximum bending moment on a bridge slab due to class AA tracked vehicle m_1 x100 =3.8 and m_2x100 = 3.1

   (c) What are the limitations of Pigeaud's Method? How do you take into account a non-symmetrical load?

3. Attempt any **TWO** parts of the followings   **10x2=20**

   (a) Determine the maximum bending moment for a two lane deck slab for following data: clear span = 5.0 m,   wearing coat = 100mm, thickness of slab = 500 mm

   K = 2.66   IRC class AA wheeled vehicle,   Footpath on either side = 1.0m

   (b) Compute the bending moment for above data, for IRC 70 R loading.

   (c) Discuss the Courbon's method to determine reaction factor for longitudinal girders for a T - beam bridge.

4. Attempt any **TWO** parts of the followings   **10x2=20**

   (a) Why box culverts are economical than slab culvert? Discuss the design method?

   (b) Determine the reaction factor for outer longitudinal girders.
Spacing of girders = 3.5 m, Number of girders = 03, width of girder = 300 mm, depth of girder = 1.2 m width of carriage way = 7.5 m , five cross girders at spacing of 3.5 m, Live Load Class AA Tracked vehicle.

   (c) Write short note on Electromeric bearing to be used for modern bridges.

5. Attempt any **ONE** parts of the followings   **20x1=20**

   (a) verify the stability of the brick masonry abutment for the following details:
Material of masonry M15 grade, density of soil = 18 KN/sq m
Coefficient of friction = 0.5, angle of repose of soil = 30 degree
Live Load on the bridge = IRC 70 R Loading, Top width = 1.4 m
Height = 5.5 m batter = 1 in 15.

   (b) Verify the adequacy of the dimensions of the pier for following details.
Top width of pier = 1.75 m. Height = 15 m, c/c of bearing = 1 m
Side batter = 1 in 12, span of the bridge = 14.5 m, IRC class AA Tracked vehicle Carriage way width = 7.5 m, 03 numbers T- beam girders of size 300x1500 mm, 05 nos. cross girders of size 250x1200 mm, Thickness of deck slab = 200 mm. Material of pier = M25 Grade concrete.

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