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BICEE-010

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00136

June, 2015

BICEE-010 : ANALYSIS AND DESIGN OF BRIDGES

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks.*

1. Explain briefly the principles of design of the following : *14*

(a) Mid-span section of a girder

(b) End block of a girder

(c) Deck slab in 'gap slab' type of deck

2. What are the different types of expansion bearings for girder bridges ? State the circumstances under which each would be appropriate. *14*

3. (a) How will you design the deck slab of a skew culvert, if the angle of skew is

(i) 10°,

(ii) 20° ? *10*

(b) Typically lay out a skew slab bridge with skew angle 10°. *4*

4. Determine the design discharge after computing the maximum discharge by (a) Empirical Method and (b) Rational Method for the following data : *14*

Catchment area = 160 km^2 (f = 0·67)

Distance of site from coast = 12 km (c = 6·8)

Distance of critical point to bridge site = 16 km

Difference in elevation between the critical point and the bridge site = 96 m

Peak intensity of rainfall = 60 mm/hr

P = 0·30.

5. Design the deck slab for one span for a T-beam bridge to be built on a rural section of a State highway. The bridge consists of five spans of 14·5 m. Assume moderate exposure and cement concrete wearing course. Clear roadway = 7·5 m, Three T-beams spaced at 2·5 m interval, Effective span of T-beam = 14·5 m. Assume five cross beams at 3·625 m intervals. Use M-25 grade concrete and Fe-415 steel. Clear cover to reinforcement = 40 mm. Thickness of slab = 215 mm, Thickness of wearing course = 75 mm. *14*

6. Describe Courbon's method for load distribution and indicate its limitations. *14*

7. Write short notes on any ***two*** of the following : *2×7=14*

   (a) Normal Depth of Scour

   (b) Culverts (R.C. & pipe)

   (c) Comments on the design of the Tacoma Narrows first bridge which failed