

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2016

**BRIDGE ENGINEERING**

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

(Use of codes IRC:6-2000, IRC:21-2000, IS 456:2000, IS 800:2007, IRC:83-(Part-I)-1999, IRC:83-(Part-II)-1987 and Pigeaud's curves is permitted in the examination hall)

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- 1 (a) What are the important requirements of an ideal project? Mention the various considerations important from the point of view of selection of a suitable site for the same.  
(b) Explain the various IRC bridge loading in the design of highway bridges.
- 2 Design a box culvert with the following data:  
Inner dimension: 2.75 x 3.0 m  
Loading : IRC class AA (tracked)  
Materials : M<sub>30</sub> concrete and Fe415 grade steel  
Type of road : Two lane  
Height of the embankment above the box = 1.25 m  
Unit weight of soil = 17.5 kN/m<sup>3</sup>  
Type of stream : non – perennial
- 3 Design one series of simply supported of R.C.C deck slab bridge for IRC class AA tracked load for the following data.  
Clear span : 7.0 m  
Clear road width : 6.6 m  
Thickness of pier : 1.0 m  
Kerb width : 225 mm  
Thickness of weariness coat : 75 mm  
Materials: M<sub>25</sub> concrete and Fe415 grade steel.
- 4 Obtain Courbon's reaction factor and maximum bending moment in case of a T-beam bridge have the following data.  
Road way : 2 lanes  
Loading : IRC class AA tracked  
No.of main girders 3 and spaing 2.5 m  
Span of the bridge = 16 m  
Kerb width = 750 mm on either side.
- 5 (a) What are the steps involved in the design of plate girder?  
(b) What is meant by curtailment of plates and how this done in the plate girders?  
(c) When do you provide splicing of webs and flanges?

Contd. in page 2

- 6 Design a composite bridge super structure with the following data:  
Span : 18 m  
No.of lanes : Two  
Line load : IRC class A – A tracked  
Materials: M<sub>30</sub> and Fe500 steel.
- 7 Design an elastomeric unreinforced pad bearing for the following data:  
Vertical load = 250 kN  
Horizontal force = 75 kN  
Modulus of rigidity of elastomer = 1.2 N/mm<sup>2</sup>  
Friction coefficient = 0.45.
- 8 Write short note on:  
(a) Types of piers.  
(b) Forces acting on piers.  
(c) Stability analysis of piers.  
(d) Types of wing walls.  
(e) Types of bridge foundations.  
(f) Different types of abutments.

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