

Code No: H8709/R13

M. Tech. II Semester Regular/ Supplementary Examinations, July-2016

**BRIDGE ENGINEERING**

(Common to SE and SD)

*Use of IS and IRC codes are permitted.***Time: 3 Hours****Max. Marks: 60**

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*Answer any FIVE Questions*  
*All Questions Carry Equal Marks*

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1. Briefly explain design details of masonry arch bridge. 12
2. A reinforced concrete simply supported slab is required for the deck of a road bridge having the following data:- 12  
Clear span = 5.5 m.  
Width of carriage way = 7.5 m.  
Foot path on either side = 1m wide.  
Materials = M20 grade concrete and Fe 415 steel.  
Type of loading IRC class AA. Design the deck slab. Show the reinforcement details.
3. Explain briefly Pigeauds method and Hendry-Jaugar method. 12
4. Briefly explain elements of a plate girder and their design. 12
5. A prestressed concrete slab, 400 mm thick with parallel post-tensioned cables, is provided for a road bridge of effective span 8 m. The live-load analysis indicates an equivalent live load of 45 kN/mm<sup>2</sup>. The force at transfer in each of the cables is 450 kN. If the compressive stress permissible in concrete at transfer is 18 N/mm<sup>2</sup>, design the slab as class 1-type member and determine the spacing of the cables and their eccentricity at mid-span. Assume a loss ratio of 0.8. 12
6. Design a post-tensioned pre-stressed concrete slab bridge deck for a national highway crossing to suit the following data: 12  
Clear span 10 m; Width of bearing 400 mm; Clear width of roadway 7.5 m; Footpath 1m on either side; Kerbs 600 mm wide; Thickness of wearing coat 80 mm wide; Live load I.R.C. Class AA tracked vehicle; Type of structure Class 1 type; Materials: M45 grade concrete and 7 mm diameter high-tensile wires with an ultimate tensile strength of 1600 N/mm<sup>2</sup> housed in cables with 12 wires and anchored by Freyssinet anchorages of 150 mm diameter.  
For supplementary reinforcement, adopt Fe – 415 grade HYSD bars; Compressive strength at transfer;  $f_{ci} = 35 \text{ N/mm}^2$ ; Loss ratio = 0.8

