

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2015

BRIDGE ENGINEERING

(Civil Engineering)

(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 are permitted in the examination hall)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Indicate the extent of survey to be undertaken and the relevant data to be collected for fixing site and waterway of the bridge.
(b) List out the various loads and forces acting on the design of bridges and also write short note on impact factor.
- 2 Design a box culvert with the following data.
Inside dimensions: 3.75 x 3.75 m
Live load : IRC class AA tracked
Density of soil : 19 kN/m³
Angle of repose : 30°
Materials: M25 concrete and Fe415 grade steel.
- 3 Design simply supported RCC deck slab of a road bridge for IRC class AA tracked wheel load for the following data.
Clear span = 8.0 m
Clear road width = 6.6 m
Thickness of pier = 1.0 m
Kerb width = 225 mm
Thickness of wear coat = 80 mm
Materials: M20 concrete and Fe415 steel.
- 4 Design the interior slab panel of a reinforced concrete T– beam bridge using the following data.
Clear width of road way = 8.5 m
Effective span = 20 m
Use M20 grade concrete and Fe415 steel.
- 5 (a) A plate girder of Fe410 steel is composed of a 10 x 2000 mm, web and 30 x 500 mm flanges. The girder span is 15 m. Stiffeners are placed at 1 m, 3 m and 15 m from both ends. Determine the shear strength of the each panel.
(b) What are the different modes of failures of a plate girder?
- 6 Design a composite bridge deck consisting of a RCC slab on steel girders. The span of the bridge is 15 m.
Road : Two lane highway
Kerbs : 700 mm on either side
No. of steel girders : 4
Spacing of girders = 2.5 m C/C
Materials: M30 concrete and Fe415 steel.
- 7 Design a mild steel rocker bearing for transmitting the super structure reactive load of 1500 kN.
Allocable pressure on bearing block = 5 MPa
Permissible bending stress = 165 MPa
Permissible bearing stress = 100 MPa
Permissible shear stress = 105 MPa.

8 Write short note on:

- (i) Types of forces acting on abutments. (ii) Bed block.
- (v) Stability analysis of piers. (vi) Wing walls and approach slab.
