

B.Tech IV Year I Semester (R15) Regular Examinations November/December 2018

BRIDGE ENGINEERING

(Civil Engineering)

(Use of IS and IRC codes are permitted in the examination hall)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Draw a neat sketch IRC class AA loading with salient features.
 - State the various types bearings used in bridges.
 - What are the advantages of deck slab bridges?
 - How to calculate the effective width of slab in case slabs spanning in one direction for single concentrated load?
 - Explain briefly about Guyon-Massonet method.
 - How to evaluate bending moment co-efficient values using Pigeaud's curves?
 - Explain the procedure in calculation of loads acting on plate girder bridges.
 - State the role of shear connections in composite bridges.
 - What are the forces considered in design of Pier?
 - What are the different types of wing walls?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) What are the Highway loading standards?
(b) Illustrate various loads considered in design of box culvert with suitable figure.

OR

- 3 (a) A reinforced concrete box culvert is required for a national highway crossing. The clear vent way of the box culvert is 3 X 3 m. Design the box culvert assuming a superimposed dead load of 12kPa and a live load of 40 kPa. The density of the soil is 18kN/m³ and a repose of the soil is 30°. Adopt M-25 grade concrete and Fe-415 grade steel. Sketch the details of reinforcement.

UNIT – II

- 4 A road bridge deck contains of a reinforced concrete slab continuous over T-beams spaced 3 m apart and cross girders spaced at 5m c/c. Thickness of wearing coat is 100 mm. Type of loading is IRC class AA tracked vehicle. Use M-30 grade concrete and Fe-500steel grade. Design the RC slab and show the details of reinforcement along longitudinal and cross section.

OR

- 5 Design a deck slab bridge to suit the following data:
Effective span = 8m
Thickness of wearing coat = 75 mm
Width of road = 7.5 m with kerbs 500 mm on either side
Loading = IRC class AA tracked vehicle
Materials used = M-30 grade concrete and Fe-415 HYSD steel bars.
Sketch the reinforcement details of the deck slab bridge.

Contd. in page 2

UNIT – III

- 6 Design a RCC T-beam girder bridge for the following data:
Clear width of road way = 7.5 m
Span (C/C of bearings) = 12m
Live load = IRC class AA tracked vehicle
Average thickness of wearing coat = 100 mm
Grade of concrete used = M-25 and Fe-500 grade steel are used.

OR

- 7 Design an interior slab panel of RCC T-beam girder bridge for the following data:
Clear width of road way = 7.5 m
Span (C/c of bearings) 16m
Live load = IRC class AA tracked vehicle
Average thickness of wearing coat = 80 mm
Grade of concrete used: M -30 and Fe-415 grade steel are used.

UNIT – IV

- 8 Design a plate girder for a B.G track to suit the following requirements:
Span of the bridge = 15m
Dead load of sleepers, rails and other fittings = 10 kN/m
Dead load of track = 7.5 kN/m
E.U.L.L for B.M. calculations / track = 1631 kN
E.U.L.L FOR shear calculations/ track = 1801 kN.

OR

- 9 Describe the steps involved in design of composite bridge.

UNIT – V

- 10 How to check the stability of abutment? Explain.

OR

- 11 (a) Explain different types of bridge foundations.
(b) State the general features of abutments.
