

**FACULTY OF ENGINEERING**  
**B.E. 4/4 (Civil) I Sem. (Main) Examination, December 2011**  
**STRUCTURAL ENGINEERING DESIGN AND DETAILING – II (Steel)**

Time: 3 Hours]

[Max. Marks: 75

**Note :** Answer *all* questions from Part A. Answer *all* questions following internal choice from Part B.

## PART – A

(25 Marks)



1. What is the purpose of providing intermediate vertical stiffeners in a plate girder ? 2
2. What is a flange splice ? Is it desirable to provide or not ? 3
3. Explain the term “max. static wheel load” as applied to crane girders. 3
4. Sketch a rocker type of bearing. Name the components. 3
5. How do you estimate the self weight of a riveted plate girder bridge ? 2
6. Explain the function of bottom lateral bracing in a truss bridge. 2
7. How is the economical span of a bridge fixed ? 2
8. List the different types of I.S. standard railway loadings. 3
9. How is the curtailment of flange plates done in a plate girder ? 3
10. In which type of bridge counter-bracing is provided and why ? 2

## PART – B

(50 Marks)

11. Design the mid span section of a welded plate girder of 25 m span carrying a u.d.l. of 30kN/m. Sketch the section. 15
- OR
12. Design the end bearing stiffener for a simply-supported plate girder of span 20 m carrying a u.d.l. of 150 kN/m. Sketch the details, if the web plate is 2500× 8 mm; Flange plates 500× 20mm each at top and bottom ; 4 flange angles ISA : 200×150×18 mm. 15
  13. Design a simply-supported gantry girder for the following data :
    - Crane girder : 300 kN
    - Wt. of trolley : 100 kN
    - Wt. of crane (excluding trolley) : 190 kN
    - Minimum approach of crane hook : 1.2 m

C/C of crane wheel : 3.5 m

C/C of cranes of gantry girder : 18 m

Span of gantry girder : 6m

Wt. of rail section : 0.3 kN/m

Ht. of rail section : 75 mm.

15

OR

14. Illustrate the design and detailing procedure of a Rocker bearing for a steel bridge assuming suitable numerical data. Give neat sketches.

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15. Design a deck-type plate girder railway bridge to be constructed for a broad gauge single track main-line loading if the effective span is 20m ; c/c of plate girders 2m. Fix up the section of the welded P.G. Carry out the usual check. Illustrate details with neat sketches.

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OR

16. Design the most highly stressed top and bottom chord members (one each) of an open web truss bridge consisting of two Pratt trusses as shown. The span of truss is 24 m c/c of bearing. The equivalent u.d.l.l. is 175 kN/m. The dead load transmitted to each truss is 15 kN/m. Assume impact factor as 15%. Sketch details neatly.

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