# Code No. 2021

## FACULTY OF ENGINEERING

**B.E. 4/4 (Civil) I-Semester (Main) Examination, November / December 2012**

**Subject : Structural Engineering Design and Detailing – II (Steel)**

**Time : 3 Hours Max. Marks: 75**

***Note:*** *Answer* ***all*** *questions of Part - A and answer* ***three*** *questions from Part-B using internal Choice.*

**PART – A** (10 x 2½ =25 Marks)

1. Explain the terms "web crippling" and "web buckling".

2. Explain curtailment of plates in plate girders.

3. What is the role of horizontal stiffeners in plate girders ? When are they provided?

4. What is the allowable longitudinal thrust in cranes?

5. Sketch the section generally used for gantry girders.

6. Mention the advantages and disadvantages of deck types bridges.

7. Explain the different stresses to which bridge bearings are subjected.

8. List out the forces acting on a gantry girder.

9. Distinguish between overturning effect and horizontal truss effect.

10. What do you understand by "EUDLL"?

**PART – B (50 Marks)**

11. Design a simply supported welded plate girder for the following data:

Effective span = 20 m

Live Load = 120 kN

Draw a neat sketch and carryout all applicable checks. (15)

**OR**

12. Design intermediate stiffeners for a riveted plate girder for the following data:

Web plate – 6mm x 1400 mm

Flange plate (at end) – 350 mm x 8 mm

Flange Angler – 2 ISA 150 x 150 x 15 mm

Design shear force – 700 kN (15)

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13. Design a simply supported gantry girder to carry an electric over head traveling crane for the following data:

Crane capacity = 300 kN

Weight of crane and crab=350 kN

Minimum approach of crane hook=1.8m

Distance between c/c of wheels = 3.0m

Bay width (c/c of gantries) = 12.0m

Span of gantry girder = 8.0 m

Draw design details. (15)

**OR**

14. Design a roller cum rocker bearing for a plate girder bridge for the following data:

Total vertical load inclusive of impact = 1100kN

Vertical load due to wind = 200 kN

Lateral load due to wind = 60 kN

Longitudinal force = 300 kN

Use M20 concrete for pedestals. Draw design details. (15)

15. A through type bridge has to be designed for the following data:

Loading = single track BG main line loading

Truss = Pratt truss

Effective span = 30 m

Spacing of main girders = 8m c/c

Design the bottom chord members and sketch the design details. (20)

**OR**

16. Design the mid span section of a welded plate girder deck type bridge for the following data:

Effective span = 30 m

EUDLL for moment = 2700 kN

EUDLL for shear = 2900 kN

Total Dead load = 450 kN

Impact factor = 0.4

c/c distance of girders = 2.0 m

Draw neat sketches of design details. (20)

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