CODE NO: 07A60103 | R07 | SET No - 1

III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
DESIGN OF STEEL STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from PART-A
Answer any THREE questions from PART-B
- - -

Note: IS 800 -1984, IS 875 - Part III, and Steel tables are permitted.

PART – A (Marks : 32 X 1 = 32)

1. Design a riveted plate girder spanning 20 m and supporting a uniformly distributed load of 100 kN/m and two concentrated loads of 500 kN at third points. Assume that the plate girder is effectively supported in lateral direction. Draw to scale:
   a) An elevation showing the plate girder with details.
   b) A plan of the flange showing curtailment of flange plates.

2. Design a simply supported gantry girder to be used in an industrial building for the following data.

Crane capacity	= 100 kN
Weight of Crab	= 35 kN
Weight of Crane (excluding crab)	= 160 kN
Minimum clearance between crane hook and gantry girder	= 1 m
Wheel base	= 3 m
Distance between c/c of gantries	= 20 m
Distance between c/c of gantry columns	= 6 m
Crane type	= M.O.T.

Draw the longitudinal elevation, cross section and plan of the plate girder.

PART – B (Marks : 16 X 3 = 48)

3.a) Explain the various types of butt welds with neat sketches
   b) A 100 mm x 10 mm plate is to be welded to another plate 150 mm x 10 mm by the fillet welding on three sides. The size of the weld is 6 mm. Find out the necessary overlap of the plate for full strength of the joint. Take the permissible tensile stress in the plate as 150 N/mm^2 and in the weld as 110 N/mm^2.

4. Design a compression member of two channels placed toe-to-toe. The length of the compression member is 8m and carries a load of 1000 kN. The width over the backs of channels is 450mm. The channels are connected by battens. Sketch the c/s of the column.

5. Design a simply supported plated rolled steel beam section to carry a uniformly distributed load of 40 kN/m inclusive of self weight. Effective span of the beam is 5 m. The depth of the beam is not to exceed 450 mm. The compression flange of the beam is laterally supported.

6. Design a gusset base for a column section ISHB 400 carrying an axial load of 1800 kN. The permissible bearing pressure on concrete is 4 N/mm^2 and safe bearing capacity of soil is 250 kN/m^2.

7. Design I section purlin with and without sag bars for a trussed roof from the following data
Span of roof = 10 m;
Spacing of purlins along slope of truss = 2.5 m;
Spacing of Truss = 4 m;
Slope of roof truss = 1 vertical, 2 horizontal
Wind load on roof surface normal to roof = 1100 N/m^2
Vertical load from roof sheets, etc = 150 N/m^2

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CODE NO: 07A60103 | R07 | SET No - 2

III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
DESIGN OF STEEL STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from PART-A
Answer any THREE questions from PART-B
- - -

Note: IS 800 -1984, IS 875 - Part III, and Steel tables are permitted.

PART – A (Marks : 32 X 1 = 32)

1. Design a welded plate girder spanning 25 m and supporting a uniformly distributed load of 150 kN/m and two concentrated loads of 300 kN at third points. Also design the stiffeners. Draw to scale:
   a) Cross section of plate girder.
   b) Longitudinal elevation of plate girder.

2. An electrically operated overhead traveling crane is to be used in a bay of an industrial building. Design the gantry girder for the following data.

Crane capacity	= 250 kN
Bay width	= 18 m
Spacing of columns	= 8 m
Weight of crane and crab	= 250 kN
Minimum approach of crane hook	= 1.2 m
Wheel base	= 3.2 m

   Draw the longitudinal elevation, cross section and plan of the plate girder.

PART – B (Marks : 16 X 3 = 48)

3.a) Explain the various types of fillet welds with neat sketches
   b) An ISA 65x65x10 carries a tensile load of 200 kN, applied along its centroidal axis. This angle is to be welded to a gusset plate. Find out the lengths of side fillet welds required at the heel and toe of the angle.

4. Design a rolled steel section column which is effectively held in position but not in direction at the ends and carries an axial load of 1200 kN and an axial moment of 20 kN-m. Sketch the c/s of the column.

5. Design a built up column composed of two channel sections placed back to back, carrying on axial load of 1000 kN. The effective length of the column is 6 m. Also design a single Lacing system.

6. Design a gusset base for a column section ISHB 350 carrying an axial load of 1600 kN. The permissible bearing pressure on concrete is 5 N/mm^2 and safe bearing capacity of soil is 200 kN/m^2.

7. Design a channel section purlin with and without sag bars for a trussed roof from the following data:
Span of roof = 12 m
Spacing of purlin along slope = 2 m
Spacing of truss = 4 m
Slope of roof truss = 1 vertical, 2 horizontal
Wind load on roof = 1100 N/m^2
Vertical loads from roof sheets = 150 N/m^2.

--ooOoo--

CODE NO: 07A60103 | R07 | SET No - 3

III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
DESIGN OF STEEL STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from PART-A
Answer any THREE questions from PART-B
- - -

Note: IS 800 -1984, IS 875 - Part III, and Steel tables are permitted.

PART – A (Marks : 32 X 1 = 32)

1. Design a riveted plate girder spanning 25 m and supporting a uniformly distributed load of 120 kN/m and two concentrated loads of 600 kN at third points. Assume that the plate girder is effectively supported in lateral direction. Draw to scale:
a) An elevation showing the plate girder with details.
b) A plan of the flange showing curtailment of flange plates.

2. Design a simply supported gantry girder to be used in an industrial building for the following data.

Crane capacity	= 160 kN
Weight of Crab	= 40 kN
Weight of Crane (excluding crab)	= 180 kN
Minimum clearance between crane hook and gantry girder	= 1 m
Wheel base	= 3 m
Distance between c/c of gantries	= 22 m
Distance between c/c of gantry columns	= 5 m
Crane type	= M.O.T.

Draw the longitudinal elevation, cross section and plan of the plate girder.

PART – B (Marks : 16 X 3 = 48)

3.a) Explain the various types of butt welds with neat sketches
b) A 120 mm x 10 mm plate is to be welded to another plate 160 mm x 10 mm by the fillet welding on three sides. The size of the weld is 6 mm. Find out the necessary overlap of the plate for full strength of the joint. Take the permissible tensile stress in the plate as 150 N/mm^2 and in the weld as 110 N/mm^2.

4. Design a compression member of two channels placed toe-to-toe. The length of the compression member is 10m and carries a load of 1200 kN. The width over the backs of channels is 450mm. The channels are connected by battens. Sketch the c/s of the column.

5. Design a simply supported plated rolled steel beam section to carry a uniformly distributed load of 50 kN/m inclusive of self weight. Effective span of the beam is 6 m. The depth of the beam is not to exceed 450 mm. The compression flange of the beam is laterally supported.

6. Design a gusset base for a column section ISHB 400 carrying an axial load of 2000 kN. The permissible bearing pressure on concrete is 4 N/mm^2 and safe bearing capacity of soil is 300 kN/m^2.

7. Design I section purlin with and without sag bars for a trussed roof from the following data
Span of roof = 15 m;
Spacing of purlins along slope of truss = 3 m;
Spacing of Truss = 4 m;
Slope of roof truss = 1 vertical, 2 horizontal
Wind load on roof surface normal to roof = 1200 N/m^2
Vertical load from roof sheets, etc = 160 N/m^2.

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CODE NO: 07A60103 | R07 | SET No - 4

III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011
DESIGN OF STEEL STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from PART-A
Answer any THREE questions from PART-B
- - -

Note: IS 800 -1984, IS 875 - Part III, and Steel tables are permitted.

PART – A (Marks : 32 X 1 = 32)

1. Design a welded plate girder spanning 30 m and supporting a uniformly distributed load of 150 kN/m and two concentrated loads of 400 kN at third points. Also design the stiffeners. Draw to scale:
   a) Cross section of plate girder.
   b) Longitudinal elevation of plate girder.

2. An electrically operated overhead traveling crane is to be used in a bay of an industrial building. Design the gantry girder for the following data.

Crane capacity	= 450 kN
Bay width	= 20 m
Spacing of columns	= 8 m
Weight of crane and crab	= 200 kN
Minimum approach of crane hook	= 1.2 m
Wheel base	= 3.2 m

   Draw the longitudinal elevation, cross section and plan of the plate girder.

PART – B (Marks : 16 X 3 = 48)

3.a) Explain the various types of fillet welds with neat sketches
   b) An ISA 65x65x10 carries a tensile load of 300 kN, applied along its centroidal axis. This angle is to be welded to a gusset plate. Find out the lengths of side fillet welds required at the heel and toe of the angle.

4. Design a rolled steel section column which is effectively held in position but not in direction at the ends and carries an axial load of 1600 kN and an axial moment of 30 kNm. Sketch the c/s of the column.

5. Design a built up column composed of two channel sections placed back to back, carrying on axial load of 1500 kN. The effective length of the column is 7 m. Also design a single Lacing system.

6. Design a gusset base for a column section ISHB 350 carrying an axial load of 1800 kN. The permissible bearing pressure on concrete is 5 N/mm^2 and safe bearing capacity of soil is 300 kN/m^2.

7. Design a channel section purlin with and without sag bars for a trussed roof from the following data:
Span of roof = 12 m
Spacing of purlin along slope = 2 m
Spacing of truss = 4 m
Slope of roof truss = 1 vertical, 2 horizontal
Wind load on roof = 1200 N/m^2
Vertical loads from roof sheets = 160 N/m^2.

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