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Total No. of Printed Pages: 1

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B. Tech (Civil Engg.) (Semester – 7th/8th)
DESIGN OF STEEL STRUCTURES - II
Subject Code: BCIES1821
Paper ID: [19110743]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a) Why the stiffeners are required in plate girder?
- b) Name the loads which may be considered for the design of steel bridge.
- c) What is the role of stringer in steel railway bridge?
- d) What are advantages of welded connections?
- e) Why unequal angles with long legs connected are more efficient for tension members?
- f) Smaller size fillet welds are preferred, why.
- g) Define web buckling.
- h) Name different elements of plate girder.
- i) Define web crippling.
- j) Define shape factor.

Section – B

(5 marks each)

- Q2. Design a welded compression member of truss of length 2m to carry factored load of 150KN. Assume missing data.
- Q3. Calculate shape factor for the hollow tubular section of external diameter "D" and internal diameter "d".
- Q4. Explain different types of stiffeners used in steel plate girder.
- Q5. Determine the flexural design strength of simply supported plate girder having 20m span. The size of both the flanges is 230mm x 12mm each and web is 1100mm x 8mm. It carries super imposed load of 50kN/m. Assume missing data if any.
- Q6. Explain step by step procedure for the design of steel foot bridge.

Section – C

(10 marks each)

- Q7. Calculate Maximum Bending Moment and Shear Force only for a gantry girder of an industrial building carrying an electric overhead traveling crane, for the following data: Crane capacity = 220 KN, Self weight of crane girder excluding trolley = 200 KN, Self weight of trolley = 40 KN, Minimum approach of crane hook = 1.1 m, Distance between c/c of wheels = 3.2 m, Distance between c/c of gantries = 15 m, Span of gantry girder = 8 m, Weight of rail = 0.3 KN/m, Yield stress of steel = 250MPa.
- Q8. Determine the tensile capacity of the section, ISA 90 x 60 x 8 mm, 6 Number-16 mm bolts, pitch is 40 mm and edge distance is 30 mm.
 - a) Angle sections are placed on the same side of gusset plate (tack bolted)
 - b) Angle sections are not tack bolted
- Q9. Design stringer beam and cross girder for through type of railway truss bridge of span 32m. The cross beams are placed at 4.0 m c/c. The stringer beams are provided at 2 m c/c. The spacing of Pratt type truss girders is 5 m. Assume suitable missing data, if any.