Roll No…….. **Total No. of Printed Pages: 1**

Total No. of Questions: [09]

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.