

23431

M.E./ M. Tech. 2nd Semester (Civil Engineering)

Examination, July-2022

ADVANCED STEEL DESIGN

Paper-CE-616

Time allowed : 3 hours] [Maximum marks : 100

Before answering the questions, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each section. Question no. 1 is compulsory.

All questions carry equal marks.

Use of IS 800-2007, IS 811, IS 801, IS 875 (Part-3) are permitted.

1. Describe the following :

- (a) Design life
- (b) Fabrication tolerance
- (c) Steel beam in flexure
- (d) Column splices
- (e) Biaxial bending

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23431

Section-A

2. List the elements of an Industrial building and explain any 3 with neat diagram. 20
3. Find the shape factor of a T-Section with the flange of 150mm by 10 mm and 200 mm by 10 mm and also explain different types of beam column connections. 20
4. What are the collapse load and load combination for design purposes? 20
5. Explain the methods of Plastic hinge and also explain in detail about plastic hinge. How first order plastic analysis does differ from the second order inelastic analysis? 20

Section-C

6. (a) Explain different types of Light gauge sections.
(b) Two channels of 180mm × 80mm section with bend lips are connected with web to act as a beam. Thickness of the plate is 2.5mm and the depth of

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23431

the lip = 25mm, effective span = 4.1m. Determine the allowable load per meter run on the beam. Take $f_y = 250\text{N/mm}^2$. 15

Section-D

7. Design a slab base for a column ISHB300@630N/m to carry and axial factored load of 1100 kN. Assume Fe 410 grade steel and M20 concrete is used to provide welded connection between column and base plate. 20
8. Design a gusset base for a column ISHB350@710N/m with two plates 430 × 20mm carrying a factored load of 3400kN. The column is to be supported on concrete pedestal built with M20 concrete. 20