

AQ-2912

Faculty of Engineering & Technology
M.E. Civil (Structural Engg.) Semester—II (New-C.G.S.) Examination
ADVANCED DESIGN OF STEEL STRUCTURE
Paper—2 SFSE 2
Sections—A & B

Time : Four Hours]

[Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
- (2) Answer **TWO** questions from Section A and **TWO** questions from Section B.
- (3) Due credit will be given to neatness and adequate dimensions.
- (4) Assume suitable data wherever necessary.
- (5) Illustrate your answers wherever necessary with the help of neat sketches.
- (6) I.S.I. Hand book for Structural Steel section, I.S. Code 800/2007, I.S. 456 (Revised) I.S. 875 may be consulted.
- (7) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION—A

1. (a) Explain Allowable Stress Design. 5
(b) Explain Plastic Method of Design. 5
(c) Define shape factor. Find the shape factor for the following section :
 - (i) Hollow tube section of external diameter 'b' of and internal diameter 'd'. 5
 - (ii) T-Section. 5
2. Design a laterally unsupported beam for the following data :
 - (i) Effective span — 4 m
 - (ii) Maximum bending moment — 450 kN-m
 - (iii) Maximum shear force — 200 kN
 - (iv) Steel of grade — Fe 410. 20

3. A non-sway intermediate column in a building frame with flexible joint is 4.0 m high and it is ISHB 300 @ 618 N/m. Check the adequacy of the section when the column is subjected to following load :

- (i) Factored axial load — 550 kN
(ii) Factored moments (M_z) & (M_y)

	M_z	M_y
Bottom	+ 7.0 kN.m	– 1.0 kN.m
Top	+ 15.0 kN.m	+ 0.75 kN.m

Assume effective length 4.0 m along both the axes, $f_y = 250$ MPa. 20

SECTION—B

4. Design a welded plate girder of span 21 m with UDL of 50 kN/m and two point load 200 kN at 7 m from each support. The girder is laterally restrained. Take $F_e = 416$. 20
5. Design a foot-bridge for following data :
- (i) Span = 25 m
(ii) Width of walkway = 4 m
(iii) N-type lattice girder with 8 panels
(iv) Laterally supported by Racher
(v) The flooring consists of RCC slab 125 mm thick with floor finish 0.8 kN/m²
(vi) Live load = 6 kN/m². 20
6. Design a roof truss for an industrial building with span 21 m. The roofing is galvanized iron sheeting. The basic wind speed is 45 m/s and the terrain is an open industrial area. Building is class A with clear height of 7.5 m at the eaves. 20