Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U2603

M.E. DEGREE EXAMINATION, MAY 2024

Second Semester

Civil Engineering

21PSE203–ADVANCED STEEL DESIGN

(Regulation 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 20 = 100 Marks)

Use Following IS codes

IS: 800-2007, IS: 875 (Part I to V), IS: 801-1975, IS: 811-1987, IS: 6533-1989, IS: 802-1977, SP: 6, Steel Tables

1.	(a)	A symmetric trusses of span 20m and height 5m are spaced at 4.5m c/c. Design channel section purlin to be placed at suitable distances to resist the following loads, Weight of sheeting including bolts: 171 kN/m^2 Live load: 0.4 kN/m^2 Wind load: 1.2 kN/m^2 (Suction) Spacing of purlins: 1.4 m	CO4-Ana	(20)
		Or		
	(b)	Design a slab base for a column ISHB300@577 N/m carrying an axial factored load of 1200 kN. The M20 concrete is used for the foundation provide welded connection between column and base plate.	CO4-Ana	(20)
2.	(a)	A ISHB300@0.442 kN/m transmits a factored end reaction of 110 kN and a factored end moment of 30kNm to the flange of a column ISHB300@0.630 kN/m. Design the end connections.	CO3-App	(20)
	(b)	Design the Unstiffened seat connection at the ends of a beam ISMB 500@0.896 kN/m transmitting a factored end reaction 130kN to a column ISHB250@0.510kN/m. Use 20 mm diameter bolts of 4.6 grade, take Fe410 (f_y = 250 N/mm^2) grade of steel.	CO3-App	(20)

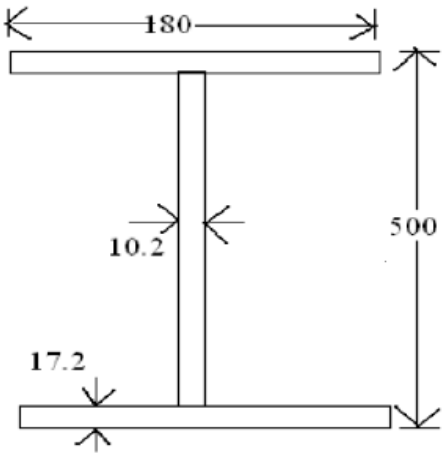
3. (a) Determine the design loads on the purlins of an industrial building near Visakhapatnam, given the following data; CO2-App (20)

Class of building: General with life of 50 years
Terrain: Category 2 and Permeability: Medium
Maximum dimension: 40m
Width of building: 15m
Height at the eve level: 8m
Topography: $\theta < 3°$
Span of truss: 15m
Pitch: 1/5
Sheeting: A.C sheets
Spacing of purlins: 1.35m
Spacing of trusses: 4m

Or

(b) A power plant structure having maximum dimension more than 60m is proposed to be built on downhill side near Dehradun. The height of the hill is 400m with a slope of 1 in 3. If the location is 250m from the crest of the hill on downward slope, and its eve board is at a height of 9m, determine the design wind pressure. CO2-App (20)

4. (a) Determine the plastic modulus for the section shown in figure below. CO3-App (20)

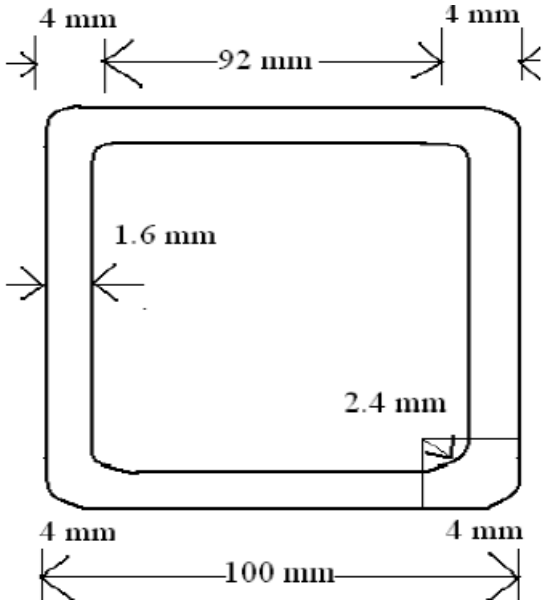


Or

(b) Find the shape factor of the I section having the following dimensions: CO3-App (20)

Top flange: 150 mm X 10 mm
Web : 10 mm X 280 mm
Bottom flange: 300 mm X 10 mm

5. (a) Calculate the column section properties and allowable load for the column section shown in fig below. The effective length of the column is 3.2 m. Take fy = 235 N/mm^2. CO5- Ana (20)



Or

(b) Compute the allowable load on the light gauge steel beam as shown below. CO5- Ana (20)