

.....B.E.(Civil Engineering) 4th Year 1st Semester..... EXAMINATION, 2024

SUBJECT Design of Structures - II

PAPER

Full Marks 100
(50 marks for each part)

Time: Three hours

Use a separate Answer-Script for each part

No. of Questions	PART I	Marks
	<p>[Use of I.S. 800 and SP-6(1) are allowed in the examination hall.] (Consider 'yield stress' of steel = 250MPa)</p> <p style="text-align: center;"><u>Answer any TWO questions</u></p> <p>1. A steel floor beam is simply supported over a span of 4.2m. It is subjected to one concentrated load of magnitude 180kN (D.L.+L.L.) acting at mid-span of the beam. Design a rolled steel ISMB-section for this beam if the compression flange of the beam is laterally unrestrained /laterally unsupported along its length. Show all checks. Assume any reasonable data, if required.</p> <p>2. Design a rolled steel ISMC section, under 'dead load, live load and wind load (suction)' combination, for a purlin member in an industrial shed having the following data: a) Angle of truss = 19°; b) Spacing of truss = 4.0 m c/c; c) Span of truss = 21.0 m; d) Spacing of purlins = 1.5 m c/c; e) Net intensity of wind pressure = 2.2 kN/m²; f) Weight of galvanized sheet = 150 N/m², g) Intensity of live load = 0.40 kN/m². Also check whether the section is safe under 'dead load, live load and wind load (thrust)' combination. Assume any reasonable data, if required.</p> <p>3. a) An ISMB 500 @86.9kg/m has been used as a column of effective length 5.0m. Calculate the load carrying capacity (P_d) of the column. b) Design a suitable 'bolted gusseted base plate' for the above mentioned column if it subjected to maximum axial load as calculated above. The base plate is to rest on a concrete pedestal having the safe bearing capacity of 9.0MPa. Assume any reasonable data, if required. Draw a neat sketch to show the details of the column with base-plate. Use 24mm diameter bolts of grade 4.6 having $A_{nb} = 353\text{mm}^2$.</p> <p style="text-align: center;">=== E N D ===</p>	<p>25</p> <p>25</p> <p>25</p>

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Ref. No.: Ex/CE/5/T/404/2024

BACHELOR OF ENGINEERING (CIVIL ENGINEERING) FOURTH YEAR FIRST SEMESTER EXAM 2024

Subject: DESIGN OF STRUCTURES-II

Full Marks:100

Time: 3hours

(Use Separate Answer scripts for each Part)

Part- II (Marks 50)

(IS 875 Part III, IS 800:2007, Steel table or SP 6 are allowed in the examination hall)

(Answer any two questions)

1. Determine the nodal wind load on the roof truss of a factory shed of following information. **25**
 - a. Truss spacing-----4.00m
 - b. Span of truss-----21m
 - c. Pitch of truss-----0.21
 - d. Number of truss-----10
 - e. Eaves height-----10m
 - f. Node to node distance at rafter level-----1.28m
 - g. Location-----Vishakapatnam

2.
 - a) Design a single angle discontinuous strut to carry a factored compressive load of 250 kN. The length of the member is 2.8m between the intersections. Assume Fe 410 steel with $f_y=250\text{MPa}$. **12**
 - b) A single equal angle **ISA 80×80×8** is connected to a 10mm gusset plate at the end with 4nos 20mm bolts to transfer tensile force. Determine the design tensile strength on the angle. **13**

3.
 - a) A tie member of truss consist an angle section **ISA 100×100×8** of Fe 410 grade is welded to 10mm gusset plate. Design the weld to transmit a factored load of 300 kN. Assume shop weld. **10**

b) Determine the number of bolts for the joint shown in Fig.1

15

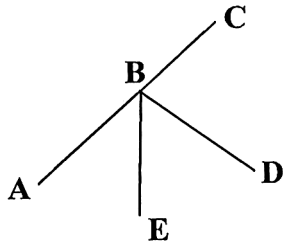


Fig. 1

Member	Maximum Force in kN	Section Provided
AB	141 Compressive	2no-ISA 60×60×6
BC	118 Compressive	2no-ISA 60×60×6
BD	86 Tensile	1no-ISA 80×80×8
BE	70 Compressive	1no-ISA 80×80×8

Use M20, 4.6 grade of bolt. Assume thickness of gusset as 10mm.