

C 14718

(Pages : 2)

Name

Reg. No.



SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
DECEMBER 2010

CE 04 603—STRUCTURAL DESIGN—II

(2004 admissions)

Time : Three Hours

Maximum : 100 Marks

All designs shall be done as per IS : specification.

S.I. units shall be followed.

Use of IS : 800, IS : 883, IS : 875 and SP6 shall be permitted in the examination hall.

- I. (a) Describe the principle of high strength friction grip bolts.
(b) What is the difference between welded and bolted connections ?
(c) What are the limitations of deflection in a laterally restrained simple beam ?
(d) What are the shear design consideration for a laterally unrestrained compound beam ?
(e) What is a column base ?
(f) What are the different types of beam connections ?
(g) What are the flexural design considerations for the timber structures ?
(h) What are the factors to be considered for wind loads in the design of roof trusses ?

(8 × 5 = 40 marks)

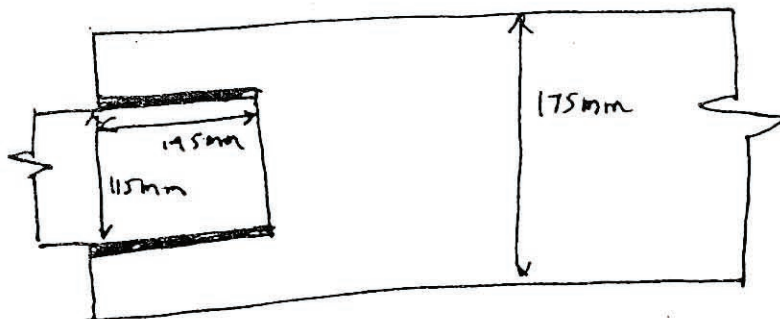
- II. (a) (i) Distinguish between welded and bolted connections.
(ii) Distinguish between rigid and semirigid analysis.

(8 marks)

(7 marks)

Or

- (b) Design a suitable longitudinal fillet weld to convert plates as shown in the below figure and to transmit a pull equal to full strength of thin plate. Allowable stress in weld in 110 N/mm^2 and tensile stress in plate is $0.6 f_y \text{ N/m}^2$. Plates of 12 mm thick. $f_y = 275 \text{ N/mm}^2$.



(15 marks)

Turn over

- III. (a) A steel column of 11m carries an axial load of 1200 kN. Column is hinged at one end and fixed at the other end. Design an economical built up section with double lacing. Design the lacing also.

(15 marks)

Or

- (b) ISMB 550 at 1.037 kN/m has been used as simply supported beam over a span of 6 m. Ends of the beam are restrained against torsion but not against lateral bending. Determine safe u.d.l. per metre length which the beam can carry.

(15 marks)

- IV. (a) A column section ISHB 300 at 0.63 kN/m with one cover plate 400 mm × 25 mm on either side is causing an axial load of 3000 kN inclusive of self weight of base and column. Design a gusseted base. The allowable bending pressure in concrete is 4 N/mm². The allowable bending stress in base plate is 185 N/mm².

(15 marks)

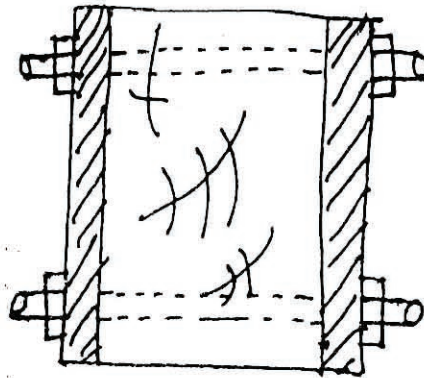
Or

- (b) Design an angle iron purlin for a trussed roof from the following data :

Span of roof truss	=	1.2 m
Spacing of roof truss	=	5 m
Spacing of purlins along slope of roof truss	=	2 m
Slope of roof truss	=	1 vertical to 2 horizontal
Wind load on roof normal to roof	=	1100 N/m ²
Vertical load from roof sheeting etc.	=	200 N/m ²

(15 marks)

- V. (a) A beam is simply supported at its both ends. The effective span is 5 m. It consists of 250 mm × 350 mm sal wood with 350 mm × 12 mm steel plates to its sides as shown in the below figure. Determine safe u.d.l. beam will support.



Or

(15 marks)

- (b) A teak wood beam carries u.d.l. of 0.7 kN/m inclusive of self weight of the beam. The beam is simply supported at both ends. The clear span of the beam is 6.5 m. Design the timber beam.

(15 marks)

[4 × 15 = 60 marks]