C 6123 (Pages 3) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 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 SP 6 shall be permitted in the examination hall.

I. (a) What do you understand by semi-rigid connections ?

(b) What are the disadvantages of bolted connections ?

(c) What are the design criteria followed in the design of laterally restained simple beams ?

(d) What are the design considerations in bearings ?

(e) Explain why the joint design in roof truss is important.

(f) Write a short note on slab base.

(g) What are the deflection considerations for the design of timper structures ?

(h) Mention the different loads to be considered in the design of roof trusses.

(8 × 5 = 40 marks)

II. (a) Design a suitable longitudinal fillet weld to connect plates shown in below fig. and to transmit a pull equal to full strength of thin plate. Allowable stress in weld is 110 N/mm^2 and tensite stress in plates is 0.6 f_y. Plates of 10 mm thick. f_y = 250 N/mm^2.

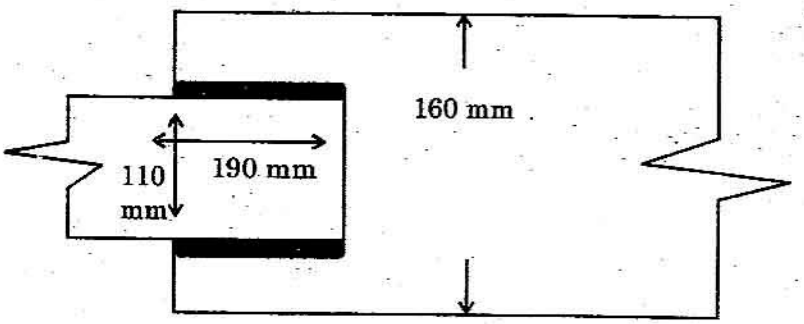

Fig. 1.

(15 marks)

Or

Turn over

(b) A double riveted double cover butt joint is used to connect plates 10 mm thick. Determine diameter of rivet, rivet value, gauge and efficiency of joint. Adopt the following stress :

Working stresses in shear in power driven rivets = 110 N/mm^2

Working stresses in bearing in power driven rivets = 290 N/mm^2

For plates working stress in axial tension is 0.6 f_y where f_y = 250 N/mm^2.

(15 marks)

III. (a) A steel column 12 m long carries an axial load of 1200 kN. Column is fixed at both ends. 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 5 m. Ends of beam are restrained against torsion but not against lateral bending. Determine the safe u.d.l. which the beam can carry.

(15 marks)

IV. (a) A column section ISMB 300 at 0.63 kN/m with one cover plate 375 mm × 22 mm on either side is carrying an axial load of 2875 kN including self wt. of base and column. Design a Gusseted base. The allowable bending pressure in concrete is 4 MPa. The allowable stress in base plate is 185 MPa.

(15 marks)

Or

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

Span of roof truss	=	1.5 m
Spacing of roof truss	=	5 m
Spacing of purlins along slop of roof truss	=	2.3 m
Slope of roof truss	=	1 vertical to 2.25 horizontal
Wind load on roof normal to roof	=	1200 N/m^2
Vertical load from roof sheeting etc	=	250 N/m^2

V. (a) A deodar timber beam carries u.d.l. (of 0.7 kN/m inclusive of self wt. of the beam. The beam is simply supported at both ends. The clear span of the beam is 6 m. Design the timber beam.

(15 marks)

Or

(b) A beam is simply supported at its both the ends. The effective span is 5m. It consists of 200 mm × 300 mm deodar wood with 275 × 10 mm steel plates to its bids as shown below. Design the safe u.d.l. for the beam.

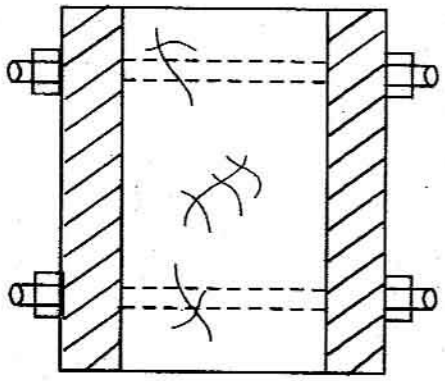

Fig. 2.

(15 marks)

[4 × 15 = 60 marks]