College of Engineering, Pune
Autumn semester End Sem. Exam 2012

Civil

CE- 304 STRUCTURAL DESIGN- I

Class : T.Y. Civil Date : 24.11.2012

Time : 2.00 pm to 5.00 pm Max. Marks : 50

Instructions :

1. *All questions are compulsory*
2. *Use of non-programmable calculator is allowed.*
3. *Use of IS 800-2007, IS 875 and steel table is permitted provided no additional write up by pen or pencil on it .*
4. *Figures to right indicate marks.*
5. *Assume suitable data if necessary.*

Q.1 A) A single angle ISA 125 x 80 x 6 is connected to 8 mm thick gusset plate with its longer leg by using weld of 4 mm size to transfer design tensile force of 300 kN. Design the welded connection. **(6)**

B) Explain Lug angle with neat sketch. State its function. **(2)**

Q.2 A structural member is subjected to ultimate tensile load of 650 kN. Design the member using unequal double angle sections and its connection with gusset plate of 8 mm thickness.
Use bolts of class 4.6 having diameter 16 mm. **(10)**

Q.3 Design the column section using two channel sections connected with battens to carry axial design load of 1200 kN. The length of column is 4.8m The one end of column is hinged and other end fixed.
Draw neat sketch of column and its connection with . **(12)**

Q.4. Design the slab base for a built up column consisting of two ISHB 400 with clear distance between web as 300 mm, to carry factored load of 2000 kN. Use concrete Grade M20 and steel Fe 410. Assume bearing capacity of soil as 350 kN/ m^2 **(10)**

Q.5 A) What is plastic hinge formation ? What are the factors affecting plastic moment capacity of steel beam ? **(5)**

B) Determine plastic modulus and shape factor about major axis of I section having web size 400 mm x 10 mm and flanges 180mm x 20 mm. **(5)**

OR

Q.5 Two secondary beams ISLB 350 @ 495 N/m and ISLB 550 @ 863 N/m transferring factored load of 280 kN and 540 kN respectively in the form of reactions. Beams are connected to the web of main beam ISMB 600 @ 1225 N/m. Design the bolted connection. Use M20 bolts of Grade 4.6 and steel Fe 410 . Draw neat sketch.

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