Total No. of Printed Pages:2

SUBJECT CODE NO:- H-527
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(CIVIL)
Design Of Structure-I (Steel)
(REVISED)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B   i) Question No.1 from section A and Q. No.6 from section B are compulsory. Attempt
                  any two questions of each section from the remaining.
                  ii) Assume suitable data if required & mention it clearly.
                  iii) Use of nonprogrammable calculators, IS 800-2007 is permitted.

Section A

Q.1   Attempt any five.   10
            a) Enlist structural steel section.
            b) What is classification of structural members?
            c) What is limit state method?
            d) What is pitch and edge distance?
            e) What is shear lag?
            f) What is effective length?
            g) What is lacing and battening?

Q.2   a) Design the lap joint between plates of sizes 100×16 mm thick and 100×10 mm thick so   08
               as to transmit a factored load of 100 kN using single row of bolts of grade 4.6 and grade
               410 plate.
               Assume e = 30 mm and area of bolt = 157 mm^2

            b) Write the procedure steps for welded connection.   07

Q.3   An equal angle 2.2 m long of a truss is connected the gusset plate, it carries ultimate tension of   15
            120 KN. Design section using 6 mm weld. and Fy = 250 N/mm^2 and Fe 410 for plate.

Q.4   A double angle discontinuous strut is to carry factored load of 275 kN. The length of strut   15
            between intersections is 2.7m. The angles are tack bolted throughout the length. Design the
            section with
            a) angles placed back to back on opposite side of gusset plate.
            b) angles placed back to back on same side of gusset plate.
            Assume F_y = 250 MPa.

Q.5   Design battened column 8 m long to carry a factor load of 1800 KN. The column is effectively   15
            held in position at both ends and restrained against rotation at one end. Providing double lacing
            system and used two channels back to back.
            Used Fy 250 N/mm^2.

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Section B

Q.6   Attempt any five.   10
       a) Explain failure modes of beams.
       b) Explain local bucking of flange.
       c) What is plate girder?
       d) What is laterally unsupported beam?
       e) What are the different load considering in the design of roof truss.
       f) Define Girder and Stringer.
       g) Enlist different types of steel structures.

Q.7   A simply supported steel joist of 4 m effective span laterally supported through out. It carries a   15
       total udl of 50 kN/m (Inclusive of self-weight). Determine an appropriate section using steel
       grade of Fe410.

Q.8   Design the plate girder for an effective span of 40 m and carrying a udl of 35 KN/m and two   15
       concentrated load of 100 KN each acting at 10 m from both ends. The girder is simply supported
       at ends against lateral buckling throughout span.
       Take $Fy = 250$ N/mm^2

Q.9   A 10×60 m building is to be constructed the steel roof truss will be used for roofing. GI sheets   15
       are used as roofing material. Suggest suitable type of roof truss. The basic wind pressure is 1000
       N/m^2. Determine dead load, Live load, Wind load on each point.

Q.10   Write short notes on
       a) Explain unrestrained beams.   05
       b) What are various section of plate girder?   05
       c) Draw the sketches of various trusses and state its suitability for span.   05