QP Code : 4221

(OLD COURSE)

(4 hrs)   Total Marks-**100**

N.B.

1) Question No. 1 is **compulsory**. Attempt **any four** out of remaining **six** questions.
2) Figures to the **right** indicate full marks.
3) Assume suitable data if needed but justify the same.
4) Use of IS 800-2007 and steel table **is permitted.**
5) Draw **neat sketches** wherever necessary to support solutions/ designs.

Q.1 a) What do you mean by plastic, compact, semi-compact & slender section? Which type of section is preferred?   (5)

b) What do you mean by intermittent fillet weld? Where do we use it? Give design steps.   (5)

c) What do you mean by external & internal wind pressure coefficient? On which factors do they depend?   (5)

d) What is the advantage of laterally restrained beam? How compression flange is restrained?   (5)

Q.2 A column section consisting of 2ISMC 250 which are placed face to face at spacing of 400 mm between webs. Determine the capacity of section if the height of column is 6 m having both ends of column held in position but not restrained against rotation. Also design suitable lacing system.   (20)

Q.3 Four columns (one at each corner) are provided for an industrial shed of plan dimension 6 m x 6 m. Design a beam supported between two columns, Top flange of beam is embedded in 250 mm thick RCC slab. The depth of beam is restricted to 600 mm. Each beam has to support a 230 mm thick brick masonry wall of 1.2 m height. Assume imposed load on slab as 4 KN/m^2 (20)

Q. 4 A truss member of 2.2 m length has to carry of 80 KN (Comp), 110 KN (Comp) & 150 KN (Tension) due to dead load, imposed load and wind load respectively. Design the member and its connection. Assume that the given loads are service loads.   (20)

Q.5 Design the gusseted base for a column ISHB 250 with cover plate 300 mm x 20 mm one in each flange. The column carries a factored load of 2700 KN. Also design the concrete pedestal.   (20)

Q.6 For an industrial shed of plan dimensions 16m x 20 m, trusses with 16 m span, are provided at spacing 4 m c/c. The central rise of truss is 2m. Design a critical purlin if there are four panel points on each principal rafter. Assume suitable roof covering material, accessibility condition and 1200 N/m^2 suction wind pressure on each slope.   (20)

Q.7 a) A beam iSMB 400 transmits an end reaction of 240 KN (factored) to the flange of a steel column ISHB 250. Design a welded stiffened seat connection.   (10)

b) A 5 m long beam carries 120 KN/m factored load on entire span, transfers this load at each end to the supporting column ISHB 250 through bracket connection. There are two bracket plates of 16 mm thickness, each being bolted with the flange of column.

Design the bracket connection if the beam end reaction has to act at distance 210 mm away from the centre of column web.   (10)

RJ-Con. 8445-15.

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