

DDSS  
TE CIVIL  
SEM VI (REV)

(4 hrs)

19/11/2014  
QP Code : 15007

Total Marks-100

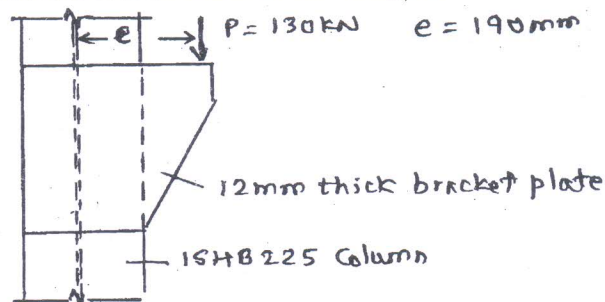
N.B.

- 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) Giving neat sketches differentiate between web buckling & web crippling. (5)  
b) What is a fillet weld? How do you decide its size? Sketch the cross section of a fillet weld indicating the size, root, toe, throat thickness & reinforcement of weld. (5)  
c) What do you mean by external & internal wind pressure coefficient? On which factors do they depend? (5)  
d) Discuss the failure modes of an axially loaded compression member. (5)

Q.2 a) For a beam ISMB 350, compute the elastic critical buckling moment  $M_{cr}$  if the beam is laterally unrestrained over a span of 4.5 m. (10)

(b) Design a bracket connection using 4.6 grade black bolt of suitable size to transmit a factored load of 130 KN, applied on a 12 mm thick bracket plate) to the flange of a column ISHB 225. The load eccentricity is 190 mm measured from the column axis as shown in figure. (10)



Q.3 The characteristic forces carried by a truss member due to dead load, live load & wind load are 70 KN (Comp), 90 KN (Comp) & 110 KN (Tensile) respectively. Design the member using angle section if the effective length of member is 2.25 m. Also design the member end connection using 4.6 grade black bolt of suitable size. (20)

Q.4 A built up column consisting of an ISHB 350 and a cover plate of size 350 mm x 20 mm attached to each flange, carries a factored axial load of 3700 KN. If the SBC of soil is 240 KN/m<sup>2</sup> and limiting bearing pressure on concrete is 6000 KN/m<sup>2</sup>, design the gusseted base including its bolted connections with column. Also design the concrete pedestal. (20)

Q.5 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)

LM-Con: 6093-14.

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- Q.6 (a) What is purlin? Give step by step procedure to design a purlin using channel section. (6)  
 b) Draw neat sketches showing details of sliding support for a steel roof truss. (4)  
 (c) 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)

Q.7 Figure shows the typical floor plan of a steel building.

Design the beam  $B_1$  ensuring the necessary safety checks. The compression flange of beam is laterally restrained throughout. Use following data-

Thickness of RCC slab = 150 mm

Imposed service load =  $4 \text{ kN/m}^2$

All beams support a 150 mm thick brick wall of height = 3.50 m

Unit weight of concrete & brick masonry is  $25 \text{ kN/m}^3$  and  $20 \text{ kN/m}^3$  respectively. (20)

