Total No. of Questions : 6]

SEAT No. :

P5803

[Total No. of Pages : 2

TE/Insem./Oct.-103
T.E. (Civil)
STRUCTURAL DESIGN - I
(2015 Pattern) (Semester - I)

Time : 1½ Hours] *[Max. Marks : 30*

Instructions to the candidates :

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Neat sketches should be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Take Fe 410 grade of steel.***
5) ***Take ultimate stress in bolt, f_{ub} = 400 N/mm^2.***
6) ***Assume Suitable data, if necessary.***
7) ***Use of electronic pocket calculator, IS: 800-2007 and steel table allowed.***
8) ***Use of cell phone is prohibited in the examination hall.***

Q1) a) State and explain type of steel structures with sketches. **[4]**

b) A tension member of roof truss consists of 2 - ISA 90 × 90 × 6 @ 8.2 kg/m which is connected to 8 mm thick gusset plate by bolts. Design connection and draw the sketch. **[6]**

OR

Q2) a) State and explain classification of hot rolled steel section with stress diagram. **[4]**

b) Determine design tensile strength due to yielding and rupture of 2-ISA 90 × 90 × 6@8.2 kg/m which are connected to back to back on opposite side of gusset plate by 4 bolts of 20 mm dia. **[6]**

Q3) A top chord member 2.2 m long of roof truss subjected to factor compressive force 250 kN and tensile force 100 kN respectively. Design section using two ISA on both side of gusset plate and the connection. **[10]**

OR

P.T.O.

Q4) A column 9 m long consisting of 2-ISMC300@ 35.8 kg/m spaced at 180 mm back to back. The column is restrained in translation but not is rotation at both ends. Determine design compressive strength of the column and design batten system with bolted connection. **[10]**

Q5) Design a gusseted base for a column ISHB 350@ 72.4 kg/m subjected to factored load of 1200 kN. The column is supported on M20 grade concrete pedestal. **[10]**

OR

Q6) Check the adequacy of ISHB 450 @ 87.2 kg/m to carry a factored compressive load of 750 kN at an eccentricity of 270 mm about major axis. The effective length of column is 5 m and compression flanges are laterally unsupported. Consider only section strength. **[10]**

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