SES

SIOT,KHARGHAR

CIVIL DEPARTMENT

ASSIGNMENT NO- 1

SUBJECT-DEGINE OF STEEL STRUCTURE **CLASS-T.Y**

---

1) State six advantages and two disadvantages of steel as a construction material.

2) Write the full form of ISA, ISWB, ISNT, ISLC.

3) Draw sketch of unequal and channel section.

4) What are the types of loads to be considered while designing the steel structures?

5) Write the types of grade of steel with their character.

6) Sketch ISWB 300 & ISMC 350, with full form.

7) Define:

a) importance factor

b) zone factor

c) response reduction factor and

d) Fundamental natural period.

8) State use of steel table and IS code.

9) Draw and explain stress strain graph for mild steel.

10) Define Limit state and state different types of limit states.

SES

SIOT,KHARGHAR

CIVIL DEPARTMENT

ASSIGNMENT NO- 2

SUBJECT-DEGINE OF STEEL STRUCTURE **CLASS-T.Y**

---

1) Design a suitable fillet weld to connect a tie bar 100 mm × 12 mm to 10 mm thick gusset Plate. Design the joint for full strength of the tie and assume welding on all three sides as Take fy= 250 MPa, γmo=1.1and fu= 410 MPa

2) A butt joint consists of two plates of 100 mm×10mm connected by 20mm dia. bolts of grade 4.6.. Calculate strength of double bolt and number of bolts to be Provided in the joint

3) State the modes of failure of bolted joints

4) State any four advantages and disadvantages of welded connections over bolted Connections

5) A tie member 100 × 10 mm has to transmit an axial load of 100 kN. Design fillet weld and calculate necessary overlap by assuming welding on all four sides. Also draw a neat sketch of connection. Take permissible shear stress in weld material as 108 MPa

6) A lap joint consists of two plates 180 × 10 mm connected by means of 16 mm dia bolts of grade 4.6. All bolts are in one line. Calculate strength of single bolt and no. of bolts to be provided in the joint.

7) Explain the types of welds with sketch

SES

SIOT,KHARGHAR

CIVIL DEPARTMENT

ASSIGNMENT NO- 3

SUBJECT-DEGINE OF STEEL STRUCTURE **CLASS-T.Y**

---

1) State with sketch different single and built-up sections of structural steel members used as tension member

2) State and explain modes of failure of axial tension member with sketch.

3) Enlist two types of sections used as a tension member along with sketches.

4) The longer leg of a single angle 90 × 60 × 10 mm is connected to the gusset

Plate with 4 bolts in a line of20 mm diameter at a pitch of 60 mm for this tension member. Determine the strength of the angle

5) Design a suitable angle section as a tie member in a truss to carry service load of 215 kN. Use double angle section connected back to back on either sides of 12 mm thick gusset plate by means of 4 – 20 mm dia. bolts in one line. Assume design strength of 20 mm dia Bolt = 45.3 kN, α=0.8, β=1.08 γmo= 1.1, γm= 1.25, fy= 250 MPa, fu= 410 MPa

6) A single angle 100 × 75 × 10 mm is used as a tension member. Connected to 12 mm thick gusset plate at ends with 5 of 18 mm dia. bolts. Bolts are pitched at 50 mm. Find Net area, if i) longer leg connected to gusset plate ii) shorter leg connected to gusset plate.

7) State with sketch different single and built-up sections of structural steel members used as tension member

8) State and explain modes of failure of axial tension member with sketch.

9) Enlist two types of sections used as a tension member along with sketches.

10) The longer leg of a single angle 90 × 60 × 10 mm is connected to the gusset

Plate with 4 bolts in a line of20 mm diameter at a pitch of 60 mm for this tension member. Determine the strength of the angle.

SES

SIOT,KHARGHAR

CIVIL DEPARTMENT

ASSIGNMENT NO- 4

SUBJECT-DEGINE OF STEEL STRUCTURE **CLASS-T.Y**

---

1) A strut 2.4 m long of a roof truss consists of a single angle 90 × 90 × 6 mm.Calculate load carrying capacity if it is connected to 8 mm thick gusset plate by welding.Assume – Properties of ISA 90 × 90 × 6 mm ; fy = 250 N/mm2Area = 1047 mm2, Cxx = Cyy = 2.42 mm rxx = ryy = 27.7 mm. rw = 17.5 mm
2) Define Radius of gyration and Slenderness Ratio. Also state maximum values of slenderness ratio for any two conditions of compression member.
3) .A discontinuous compression member consists of 2 ISA 90×90×10 mm connected back to back on opposite sides of 12 mm thick gusset plate and connected by welding. The length of strut is 3 m. It is welded on either side. Calculate design compressive strength of strut. For ISA 90×90×10, Cxx = Cyy = 25.9 mm Ixx= Iyy = 126.7×104 mm4, rzz = 27.3 mm
4) State effective length for a compression member having and conditions as i) Restrained against translation and free against rotation at one end but roller supported at the other end. ii) Restrained against translation and free against rotation at both ends.
5) Draw neat sketch showing single lacing system. Why lacing is used ?

SES

SIOT,KHARGHAR

CIVIL DEPARTMENT

ASSIGNMENT NO- 5

SUBJECT-DEGINE OF STEEL STRUCTURE **CLASS-T.Y**

---

1) Check whether ISMB 250 is suitable or not, as a simply supported beam over an effective span 6m. It carries a UDL of 15 kN/m including self it.
Properties of ISMB 250
bf = 125 mm, tf = 12.5 mm tw = 6.9 mm
Ixx = 5131.6 × 104 mm^4, Zxx = 410 × 10^3 mm^3 r1 = 13.0 mm, Zp = 465.71 × 10^3 mm^3
rmo = 1.1 Bb = 1 and fy = 250 MPa

2) Explain 'limits of width to thickness ratio to prevent buckling' for a single angle strut, the limiting width to thickness ratio for a semi-compact class is 15.7∈. Check whether ISA 90 × 90 × 6 mm is of semi-compact class or not. fy = 250 MPa.

3) Differentiate between Laterally supported and unsupported beams with a neat sketch.

4) A simply supported beam of 6 m span supports on R.C.C. slab where in comp. flange is embedded. The beam is subjected to a dead load of 25 kN/m and super imposed load of 20 kN/m, over entire span. Calculate plastic and elastic modulus required. Assume rf = 1.5, γ m = 1.1 fy = 250 N/mm^2.

5) How beam sections are classified for bending as per IS : 800 – 2007. Describe any two of them.

6) What is plate girder ? Write functions of web plate and bearing stiffeners.

SES

SIOT,KHARGHAR

CIVIL DEPARTMENT

ASSIGNMENT NO- 6

SUBJECT-DEGINE OF STEEL STRUCTURE **CLASS-T.Y**

---

1) Define stanchion and column. Draw a neat sketch of any one section used showing dimensions with usual notations.
2) A column ISMB 300 @ 46.1 Kg/m carries an axial load of 1200 kN. Design a slab base and concrete Pedestal for the column. The SBC of soil is 180 kN/m2. M20 – concrete is used for concrete Pedestal.For ISMB – 300 bf = 140 mm, tf = 13.1 mm, fy = 250 MPa, fu = 410 MPa rmo =1.1. Draw a neat sketch as per designed details.
3) Write steps to calculate the thickness of base plate used in slab base. Why anchor bolts are used in slab base.
4) Define Gusseted base. Also draw its labelled sketch showing all details.
5) What is the basic concept of deciding the plan area of slab base and concrete block below it State the function of cleat angle and anchor bolt in case of slab base.

SES

SIOT,KHARGHAR

CIVIL DEPARTMENT

ASSIGNMENT NO- 7

SUBJECT-DEGINE OF STEEL STRUCTURE **CLASS-T.Y**

---

1) Draw sketches of Howe type and Pratt type truss showing pitch, rise, panel point, panel, principal rafters and all members in one of the above types.

2) Draw a neat sketch and label of an angle Purlin with principal rafter at Panel Point having root covering is A.C. sheets.

3) State different types of loads and its combination considered during design of roof truss. Explain in brief any one of them along with its relevant IS Code.

4) A industrial bldg. has Howe roof truss having 12 m span. Take A/C sheet covering Weighing 175 N/m2, eight Panel lengths along the tie member, pitch of roof = 1/6 and weight of Purlin is 55 N/m2. Assume self at of truss as 90 N/m2. Calculate Panel Point loads for dead and live load.

5) Find the wind load per panel point for designing a roof truss of span 10 m and pitch as 1/4 The height of eaves is 5 m above ground. Assume Vb = 4m/s ; probability factor K1 =1, size factor K2 = 0.8, topography factor K3 = 1 ; Normal Permeability.

6) What is purlin ? State IS : 800 – 2007 procedure for design of angle purlin.