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Roll No. .....

6th Sem. / CIVIL Engg.

Subject : Steel Structural Design and Drawing

Time : 6 Hrs. M.M. : 120

SECTION-A

Note: Multiple choice questions. All questions are compulsory (6x1=6)

Q.1 Diameter (Ø) of the rivet in mm (CO-2)

a) $Ø = 6\sqrt{t}$ b) $Ø = t\sqrt{6}$

c) $Ø = 6\sqrt{d}$ d) $Ø = d\sqrt{6}$

Q.2 The ability of a material to deform without breaking is called (CO-1)

a) Elasticity b) Plasticity

c) Creep d) None of these

Q.3 Minimum size of fillet weld (CO-3)

a) 3mm b) 8mm c) 6mm d) 1.5mm

Q.4 If the nominal diameter of the rivet is 16mm then gross diameter of the rivet with be: (CO-4)

a) 18mm b) 14mm

c) 17.5mm d) 18.5mm

Q.5 A column of length "1" is hinged at both ends; its equivalent length will be equal to (CO-6)

a) 2Lb b) Lc

c) L/2 d) 0.707L

Q.6 Tie member is used in the steel as a ... (C)-6)

a) Compression member b) Tension member

c) Both compression and tension

SECTION-B

Note: Objective/ Completion type questions. All questions are compulsory. (6x1=6)

Q.7 ISHB Stands for .... (CO-1)

Q.8 Write the pure Bending Equation.....? (CO-5)

Q.9 Minimum pitch is the distance between the center of adjacent rivet hole not less then .... (CO-3)

Q.10 A member which are subjected to direct tension is known as..... (CO-2)

Q.11 Bending stress at Neutral axis of a section is.. (CO-5)

Q.12 Write two type of the welded joint..... (CO-6)

SECTION-C

Note: Short answer type questions. Attempt any eight questions out of ten questions. (8x4=32)

Q.13 Write the advantages and disadvantages of steel as a structural material ? (CO-2)

Q.14 Define mechanical properties of steel. (CO-1)

Q.15 What is rivet and explain its type ? (CO-4)

Q.16 What is welding and explain types of welds ? (CO-4)

Q.17 Write the assumptions made in the theory of simple bending. (CO-5)

Q.18 Write the different between long column and short column of steel ? (CO-7)

Q.19 Explain the following terms;

a) Pitch

b) Gauge Distance

Q.20 Calculate the strength of the one 16mm(nominal) diameter rivet in single share and double share when the permissible shear in rivet is 100N/mm2 (CO2)

Q.21 Calculate the safe load for a 10mm fillet welded joint having effective length of 100mm. The permissible stress-100MPa . (CO-8)

Q.22 Draw the neat sketch of the roof truss and also show its various components. (CO-09)

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x8=16)

Q.23 Explain the various types of failure in the bolted connections with neat sketches ? (CO-02)

Q.24 Two plates 12mm thick are joined by double riveted double cover butt joint as shown . Use 20mm diameter rivets, design pitch of rivets. σ_{at}=150Mpa.also find efficiency of joints.

Q.25 Explain the following terms

a) Plate Girder, b) Strut, c) Column

d) Roof truss

Steel Structure Drawing .(Part-B)

Attempt any three question out of four questions. (20x3=60)

Q.26. Draw the font elevation and detail of the join in a simple fink roof truss in which the following detail of various element are as follow:

1. Clear span=6.0m
2. pitch of truss=30°
3. Principal rafter (top chord member)=Double ISA 60x60x8mm
4. Main tie (bottom chord member)= Double ISA 60x608mm
5. Upper tie member=Sigle ISA 60x60x8mm
6. Struts (central chord members)=Single ISA 60x60x8mm
7. Cleat and purlin angles-single ISA 60x60x10mm
8. Shoe angle = Double ISA 60x60x6mm
9. Bearing plate-300mmx300x15mm
10. Rag bolts=15mmØ 150mm long
11. Rivets-20mmØ
12. Cement concrete block (1:1½:3)=300x300mmx200m
13. Thickness of wall=400mm
14. Gusset plate=8mm thick
15. Roof cover material-Corruagated A.C sheets.

Any another data required may be assumed suitably

Q27. Draw the front and side elevation of the two unequal column splicing with the following data;

Lower column=ISHB 300@618.IN/m

Upper column =ISBH250@500.3N/m

Cover plates=400mmx250x20mm

Distribution plate=300mmx250mmx20mm

Thickness of packing plates=25mm

Cleat angles=ISA 75x75x8mm

Nominal diameter of rivets=20mm

Q28. Draw the suitable scale front elevation and side elevation of framed beam to beam connection. The main beam has two radiating beams connected to its web. The top of all the beam is at the same level.

Main beam=ISMB 300@ 1202.7N/m

Secondary beams=ISLB 300@369.8 N/m (Two Nos.)

Cleat angles=90x90x10mm

Nominal diameter of rivets(d)=20mm

Q29. Draw to a suitable scale the section plain, front elevation and two different cross section of plate-girder from the following data:

Clear span of the plate girder=15m

Web plate =1200mmx12mm thick

Top and bottom flange cover plates=400mmx12mm thick

Top and bottom flange angles=4-ISA 150x150x10mm

Bearing plate=300mmx 400mm x20mm

Filler plate=10mm

End bearing stiffeners=ISA 150X 115x8mm

Intermediate stiffeners=ISA 100x75x8mm@1 m c/c

Concrete block=300mmx 400mm x200mm