Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**
PCI5I102

5th Semester Regular/Back Examination 2019-20
DESIGN OF STEEL STRUCTURES
BRANCH : CIVIL
Max Marks : 100
Time : 3 Hours
Q.CODE : HRB160

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) State Unwin's formula for finding diameter.
b) Write the expression for net Area for a single angle connected through one leg only.
c) Differentiate between single lacing and double lacing.
d) Define effective length of a column.
e) List two types of failures occurring in welded joints.
f) Write drawbacks of riveted connections.
g) State the reasons for web crippling of beams.
h) Draw the neat sketch of plug weld.
i) Define the pitch of bolts.
j) Define partial safety factor.

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) List about the various elements of Plate girders and state their functions.
b) Design the welded connection to connect two plates of width 200 mm and thickness 10mm for 90% efficiency.
c) Describe in detail about various types of loads acting on a structure as per IS code.
d) Calculate the rivet value in a lap joint used to connect two plates 12 mm thick in following cases : (a)power driven rivets (b) hand driven rivets
e) Write assumptions made in welded connections.
f) Determine the design axial load capacity of the column ISHB 300 @ 577 N/m if the length of column is 3.5 m and it's both ends pinned
g) Determine the tensile strength of a roof diagonal 100×75×10mm. The longer leg is connected to the gusset plate with 20mm diameter bolts in one row. Number of bolts is used 6. The edge/end distance= 30mm and pitch= 50mm.
h) Describe the advantages and disadvantages of use of steel in construction of various stucures.
i) Explain in detail about various types of cross sections used in design of beams.
j) A 6 mm thick angle section is jointed to a 10 mm thick gusset plate. The angle is supporting a load of 55 kN. Find out the number of 16 mm diameter power driven rivets.
k) An 18 mm thick plate is joined to a 16 mm plate by 200 mm long (effective) butt weld. Determine the strength of joint if single V butt is used. Assume the Fe410 plates and shop welds are used.
l) Write note on design of roof truss.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Design a single bolted double cover butt joint to connect the boiler plates of thickness 12 mm for maximum efficiency. Use M16 bolts of grade 4.6. Boiler plates are of Fe410 grade. Find the efficiency of the joint. **(16)**

Q4 Design a double angle tension member connected on each side of 10 mm thick gusset plate to carry an axial factored load of 450 KN. Use 20mm black bolts. Assume shop connection. **(16)**

Q5 Design a gusseted base for a column ISHB350@710 N/m with two plates 450mm×20mm carrying a factored load of 3600 kN. The column is to be supported on concrete pedestal to be built with M20 concrete. **(16)**

Q6 Design a simply supported beam of effective span 2m carrying a concentered factored load of 360 kN at mid span. **(16)**