Civil, Constr. Mgmt., Civil Engg. (Spl. Highway Engg.)
Subject:- Steel Structure Design

Time : 3Hrs.   M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory   (10x1=10)

Q.1 The main advantage of a steel member is that is (CO1)
- a) Has high strength
- c) Is gas and water tight
- b) Has long service life
- d) All of these

Q.2 The yield strength of structural TMT steel bar is about (CO1)
- a) 250 MPa
- c) 315 MPa
- b) 415 MPa
- d) 215 MPa

Q.3 The minimum pitch of the rivet shall not be less than (CO2)
- a) d
- c) 1.5 d
- b) 2 d
- d) 2.5 d

Q.4 The gross diameter of a rivet is the diameter of (CO2)
- a) Cold rivet measured before driving
- b) Rivet measured after driving
- c) Revit hole
- d) None of these

Q.5 The maximum permissible slenderness ratio of tension members liable to reversal of stress due to action of wind and earthquake is (CO4)
- a) 300
- c) 350

b) 400   d) 425

Q.6 Net sectional area of a tension member is equal to its gross sectional area (CO4)
- a) Plus the area of the rivet holes
- b) Multiplied by the area of the rivet holes
- c) Divided by the area of the rivet holes
- d) Minus the area of the rivet holes

Q.7 If a compression member of length L is restrained in rotation and translation at both the ends, then what is its effective length? (CO5)
- a) 0.5 L
- c) 0.65 L
- b) 0.85 L
- d) 1 L

Q.8 A compression member in a roof truss is called (CO5)
- a) Stanchion
- c) Strut
- b) Post
- d) Column

Q.9 Effective length of a column is the length between the points of (CO7)
- a) Maximum moments
- c) Zero shear
- b) Zero moment
- d) None of the above

Q.10 The size of the fillet weld is indicated by (CO9)
- a) Side of the triangle of the fillet
- b) Length of the weld
- c) Throat of the fillet
- d) Size of the plate

SECTION-B

Note: Objective type questions. All questions are compulsory.   (10x1=10)

Q.11 The modulus of elasticity for mild steel is approximately equal to_____. (CO1)

Q.12 ISJB 225 @ 230.5 N/m stands for_____. (CO1)

Q.13 Define tension member. (CO4)

Q.14 Give the use of tacking rivets. (CO4)

Q.15 Define Radius of Gyration. (CO5)
Q.16 A strut is_____ member. (CO5)
Q.17 Effective length of column depend upon_____. (CO7)
Q.18 A_____ is a structural member subjected to compression in direction Parallel to its longitudinal axis. (CO7)
Q.19 In rolled steel beams, shear force is mostly resisted by_____. (CO9)
Q.20 Write the formula of Anet for plates connected by zig-zag riveting. (CO9)

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 Write down the advantage and disadvantage of steel as structural materials. (CO2)
Q.22 Define Efficiency of rivet and Rivet Value. (CO2)
Q.23 Write down five properties of steel. (CO2)
Q.24 Write down five advantage and disadvantages of welding. (CO3)
Q.25 Calculate the safe load for a 8mm fillet welded joint having effective length of 120 mm. Take f_{aw} = 100 MPa. (CO3)
Q.26 Calculate the effective area and tensile strength of a tension member ISA 100x75x10 mm when it is connected by its longer leg to a gusset plate at either end using 20 mm diameter rivets. Take fst = 150 MPa. (CO4)
Q.27 Enlist various steps of designing the tension members. (CO4)
Q.28 Calculate the load carrying capacity of ISLB 350

@485.6N/m to be used as a column. The effective length of column is 5m. (CO5)
Q.29 Describe angle iron strut as discontinuous members. (CO5)
Q.30 Explain different type of truss modeling by line diagram. (CO6)
Q.31 Define various types of loads. (CO6)
Q.32 Define web crippling and web buckling. (CO7)
Q.33 Differentiate between long and short column. (CO7)
Q.34 State bending equation. (CO8)
Q.35 What do you mean by foundation and also explain its purposes. (CO10)

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 Calculate the strength of ISA 100 x 65 x 8 mm when used as a tension member with its longer leg connected at its ends by fillet weld. Take permissible tensile stress as 150 N/mm². (CO4)
Q.37 A strut in a roof truss carries an axial compressive load of 150 KN. Design a suitable double angle section for the member. The length of strut between centre of intersection is 3 m. Also Design its riveted end connections. (CO5)
Q.38 An ISMB 500 @ 852.5 N/m has been used as beam. Calculate maximum bending moment and average shear stress when it carriers a u.d.l of 35 KN/m over an effective simply supported span of 8 m. Given : tw = 10.2 mm and Z_{xx} = 1808.7cm³. (CO8)