C Reg. No. :

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. A piece of round Steel forged in place to connect two or more Steel members is known as   CO1- R

    (a) Bolt   (b) Revit   (c) Screw   (d) Stud

2. Which is tension number   CO2- R

    (a) Strut   (b) Boom   (c) Tie   (d) Rafter

3. When compression members are overloaded, then their failure takes place because of   CO3- R

    (a) Direct compression   (b) Excessive bending

    (c) Bending combined with twisting (d) Any of these

4. Any major beam in a structure is known as   CO4- R

    (a) Subsidiary beam   (b) Joist   (c) Girder   (d) Secondary beams

5. In a plate girder, the vertical stiffners are provided when the ratio of clear depth to the thickness of web exceeds   CO5- R

    (a) 50   (b) 65   (c) 75   (d) 85

6. Define Prying action.   CO1- R

7. What is mean by tension splice.   CO2- R

8. Define strut .   CO3- R

9. Write short note on section classification.   CO4- R

10. Draw any two profile of trusses.   CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) A single bolted double cover butt joint is used to connect two   CO1- App   (16)
         plates 6 mm thick. Assuming the bolts of 20 mm diameter at
         60 mm pitch. Calculate the efficiency of the joint. Used for
         410 Mpa plates and 4.6 grade bolts.

                                    Or

    (b) Design a connection to joint two plates of size 250 x 12 mm of   CO1- App   (16)
         grade Fe 410, to mobilize full plate tensile strength using shop
         fillet weld, if
         (i) a lap joint is used
         (ii) double cover butt joint is used

12. (a) A tie member in a bracing system consists of two angles   CO2- App   (16)
         75 x 75 x 6 mm bolted to a 10 mm gusset, one on each side using
         a single row of bolts and tack bolted. Designed the tensile
         capacity of the number of bolts required to develop full capacity
         of the member. What will be the capacity if the angles are
         connected on the same side off the gusset plate and tack bolted.
         What is the effect on tensile strength if the members are not tack
         bolted?

                                    Or

    (b) A single unequal angle 100 x 75 x 6 mm is connected to a 10 mm   CO2- App   (16)
         thick gusset plate at the ends with six 16 mm diameter Bolts to
         transfer tension. Determine the design tensile strength of the
         angle assuming that the yield and the ultimate stress of Steel used
         are 250 MPa 410 MPa.
         (i) if the gusset is connected to the 100 mm leg.
         (ii) if the gusset is connected to the 75 mm leg.

2

56103

13. (a) Determine the design axial load on the column section ISMB 350, given that the height of the column is 3 m and that it is pin ended. Also assume the following: Fy=250N/mm^2; Fu=410 N/mm^2; E=2 X 105 N/mm^2 CO3- Ana   (16)

Or

(b) Design a laced column 10m long to carry a factored axial load of 1100 KN. The column is restrained in position but not in direction at both ends. Provide single lacing system with bolted connection. Design the column with two channels back to back.   CO3- Ana   (16)

14. (a) Design a simply supported beam of 7 m and carrying a reinforced concrete floor capable of providing lateral restraint to the top compression flange. The total UDL is made up of 100 kN dead load including self weight plus 150 kN imposed load. In addition, the beam carries a point load at mid span made up of 50 kN dead load and 50 kN imposed load.   CO4- App   (16)

Or

(b) Calculate the moment carrying capacity of a laterally unrestrained ISMB 400 member of length 3m.   CO4- App   (16)

15. (a) Design a Purlin on a sloping roof Truss with the dead load of 0.15 kN/m^2(cladding and insulation),a live load of 2 kN/m^2 and wind load of 0.5 kN /m^2(suction). The purlins are 2m center to center and of span 4m simply supported on a rafter at a slope of 20degrees. Provide channel section purlin.   CO5- U   (16)

Or

(b) Write the step by step design procedure for gantry girder in detail.   CO5- U   (16)

56103