C

Question Paper Code: 52U02

M.E. DEGREE EXAMINATION, MAY 2018

Second Semester

Structural Engineering

15PSE202 - STEEL STRUCTURES

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 1= 5 Marks)

1. When the columns carrying heavy loads, which type of bases are used   CO1- R

   (a) Column   (b) Simple   (c) Slab   (d) Gusset

2. _____type of connection used to restrained the end rotation.   CO2 -U

   (a) Semi-Rigid   (b) Rigid   (c) Simple   (d) Frame

3. In case manually operated crane the maximum deflection is   CO3- R

   (a) L/500   (b) L/300   (c) L/400   (d) L/750

4. Squash load ratio is denoted by   CO4 -R

   (a) N/N_p (b) N_p/N (c) Z/Z_p (d) Z/Z_e

5. The Euler critical load for a column with both ends hinged is   CO5- R

   (a) $\pi^2 EI/L^2$ (b) $2\pi^2 EI/L^2$ (c) $4\pi^2 EI/L^2$ (d) $0.707\pi^2 EI/L^2$

6.   Classify the types of moment resistant bases.   CO1-R

7.   Define moment – resistant connections and its types.   CO2-U

8.   What are the major components of an industrial buildings?   CO3-U

9.   Write the fundamental conditions for plastic analysis.   CO4-U

10. What are cold-formed steel structures?   CO5-U

PART – C (5 x 16= 80Marks)

11. (a) Explain the procedure for design of moment resisting base plates.   CO1- U   (16)

Or

(b) Briefly explain the column bases and its types with neat sketch.   CO1- U   (16)

12. (a) Design the stiffened seat connection for a beam ISMB 350 CO2- App (16)
        transmitting a factored end reaction 320kN to a column
        ISHB300.Use 20 mm diameter boltsof 4.6 grade, take Fe410
        (f_y = 250 N/mm^2) grade of steel

Or

(b) Design welded seat angle connection between a beam ISMB 300 CO2- App (16)
    and a column ISHB 200 for a factored end reaction of beam
    100 kN, assuming Fe410 grade of steel (f_y = 250 Mpa) and site
    welding.

13. (a) A roof truss shed is to be built in Lucknow for an industry. The CO3-U (16)
        size of shed is 24m x 40m. The height of building is 12m at the
        eves. Determine the basic wind pressure.

Or

(b) A power plant structure having maximum dimension more than CO3-U (16)
    60m is proposed to be   built on downhill side near Dehradun. The
    height of the hill is 400m with a slope of 1 in 3. If the location is
    250m from the crest of the hill on downward slope, and its eve
    board is at a height of 9m, determine the design wind pressure.

14. (a) Design the continuous beam with the ultimate load as shown in CO4 - Ana (16)
        figure. Provide uniform cross-section.

52U02
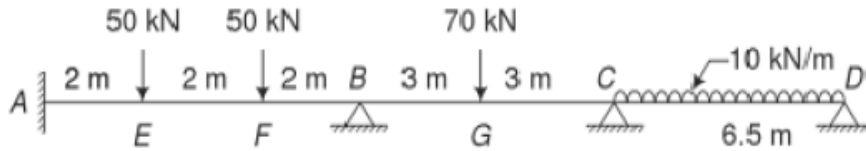
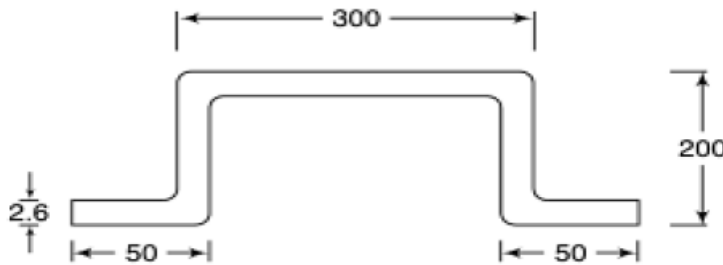Or

(b) Design the continuous beam with the service load as shown in the fig. The load factor may be assumed as 2. Provide a uniform cross section throughout the beam.   CO4 - Ana   (16)
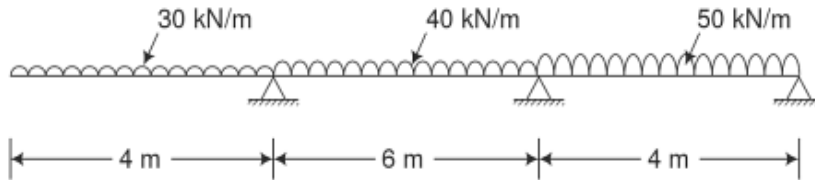
15. (a) Compute the allowable load on the light gauge steel beam as shown below.   CO4 - App   (16)

Or

(b) Determine the allowable load per meter on the beam as shown below. Also, determine the deflection at the allowable load. The length of the column is 3.1m. The two sections are joined together by spot welding. The steel has a yield point of 235 N/mm2. Take $E = 2 \times 10^5 \text{N/mm}^2$.   CO5-App   (16)

3

52U02