

[01 – 3212]

III/IV B.E. DEGREE EXAMINATION.

Second Semester

Civil Engineering

STEEL STRUCTURES – II

(Common for Civil and Civil Environmental
Engineering and Dual Degree Program in Civil
Engineering)

(With Effective from the admitted batch of 2008–2009)

Time : Three hours

Maximum : 70 marks

Question No.1 is compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

Assume suitable data wherever necessary.

Use of IS – 800 – 2007 and steel tables is allowed.

1. (a) What are the main characteristics of plate girder?
- (b) What are the various types of stiffness used in a plate girder?

7. The effective span of a plate girder through type bridge for a single broad gauge track is 30 m. The dead load, live load and impact load reaction is 1200 kN. The vertical reaction due to overturning effect of wind at each end of girder is 80 kN. The lateral load due to wind at each bearing is 34 kN. Design the rocker bearing.

8. Design the section of a deck type plate girder railway bridge for a single meter gauge main line loading over an effective span of 24 m.

Spacing of plate girders = 1.3 m C/c.

Weight of stock rails = 0.6 kN.m.

Weight of girder rails 0.4 kN/m.

Weight of fastenings = 0.2 kN/m of track.

Sleepers (Timber) 250 × 250mm × 2 m@ 0.4 m C/c.

Density of sleepers 7.5 kN/m³.

- (c) What are the assumption in the design of plate girder bridges?
- (d) What are the components of pre steel tank?
- (e) State upper and lower bound theorems.
- (f) What is load factor?
- (g) What is curtailment of flange plates in a plate girder?

2. Design a welded plate girder of span 24 m to carry a super imposed load of 35 kN/m. Avoid use of bearing and intermediate stiffness use Fe 415 steel.
3. Design a simply supported plate girder of span 15 m carrying a factored udl of 48 kN/m using only end stiffness. Assume complexes flange is laterally supported.
4. Design an elevated rectangular steel water tank of 70,000 letters capacity. The details are Height from top of foundation to top of columns 18 m, Wind speed = 44 m/s, Seismic zone = 3, Foundation = Isolated columns.

5. (a) Find the shape factor for a square of side 'a' with its diagonal parallel to ZZ axis.
- (b) Find out the collapse load for a portal frame shown. The beam and columns are of same cross section. Also draw the plastic moment diagram.

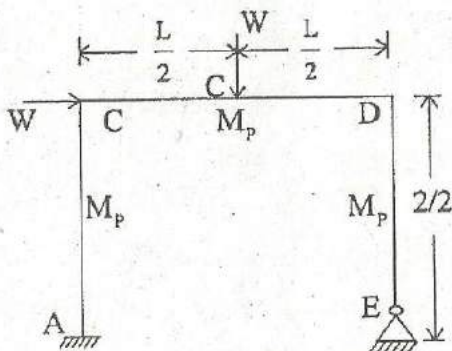


Figure 1

6. (a) Explain shape factor.
- (b) A propped cantilever ABCD is loaded as shown in the figure. Find the collapse load if the beam is of uniform cross section.

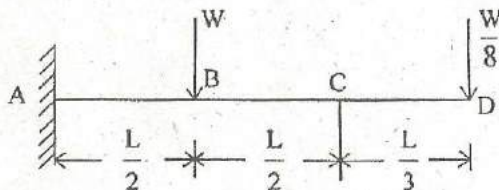


Figure 2