B. Tech. 7th Semester (Civil Engg.) Examination,

May–2011

DESIGN OF STEEL STRUCTURES - II

Paper - CE-401-E

Time allowed : 3 hours]   *[Maximum marks :100*

*Note :Attempt any **four** questions. Use of IS 800-1984 or IS 800-2007 is allowed. Use of IS 801-1975 is allowed Use of steel table or IS Handbook No. 1 is allowed.*

1.   (a)   What do you mean by plastic collapse of a structure?   10

      (b)   Find out the fully plastic moment for a portal frame shown in Figure No. 1. A uniform section is provided throughout.   15
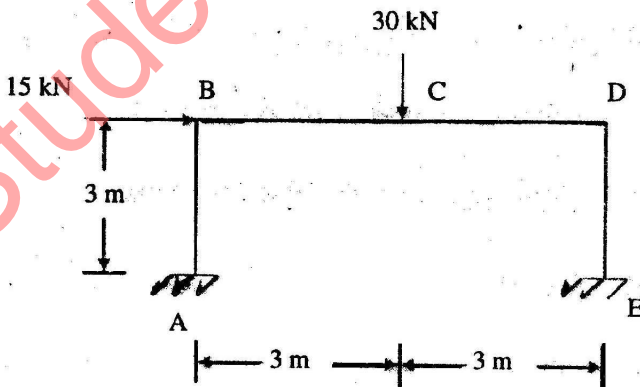

Figure No. 1

2. Find out dead load, live load and wind load for steel Fink Roof Truss shown in Figure No. 2. The trusses are spaced at 8 m c/c. Roofing is of asbestos sheets of dead weight 159 N/m². The wind load normal to roof truss is 1300 N/m². Also find the member forces due to live load only. 6+19=25
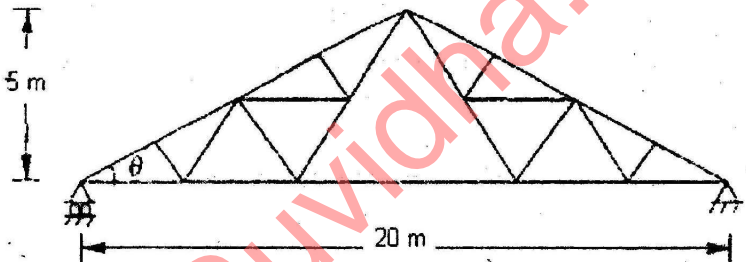

Figure No. 2

3. A overhead riveted rectangular steel flat bottom tank is to be provided for a capacity of 1,00,000 liters. The available width of the plate is 1.2 m. and length up to 8 m. Design the following for this :

   (i) Thickness of steel plate for tank.

   (ii) T-covers

   (iii) Stays   5+10+10=25

4. (a) What are the different loads considered for the design of Transmission line towers?   6

(b) What are the different components of steel stack?   6

(c) Give the classification for Towers.   7

(d) Discuss in detail the loads considered for steel stack design.   6

5. (a) Explain the various elements of Industrial building.   10

(b) Design an I-section purlin for the following data :

(i) Spacing of roof trusses : 5 m

(ii) Spacing of purlins : 1.5 m

(iii) Pitch of roof : 1/4.5

(iv) Weight of G.I. sheeting : 133 N/m^2

(v) Wind load intensity normal to roof : 1200 N/m^2 15

6. (a) What is the *Effective design width* of cold formed section? What do you mean by *Effective section*?

6+4=10

(b) A column section, as shown in Figure No. 3, is to be used as a column section. The effective length of the section is 3.2 m. Determine the allowable load. The properties of the section are as follows :

A = 621 mm², I_{xx} = 994500 mm⁴.
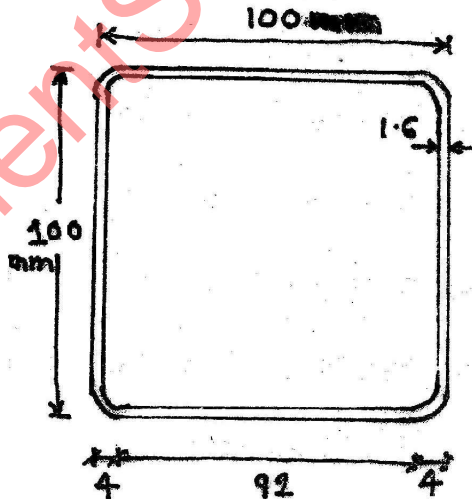
Take σ_y = 235 N/mm². 15

Figure No. 3

7. Design a continuous beam as shown in Figure No. 4. The load factor is 1.7 and the shape factor is 1.13. Uniform section is provided for the whole span of the beam.　　25
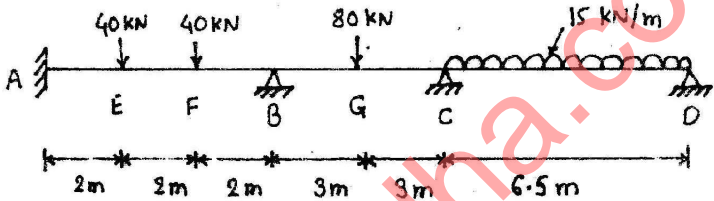

Figure No. 4