

Roll No.

OLE-24511

B. Tech. 7th Semester (Civil) F. Scheme

Examination – April, 2021

DESIGN OF STEEL STRUCTURE-II

Paper : CE-401-F

Time : Three hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Q. 1 is *compulsory*. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least *one* question from each Section. Use of IS 800- 1984 or 2007, IS 875-1987 and IS 801-1975 is allowed. Use of Steel Table is allowed. Assume suitable data.

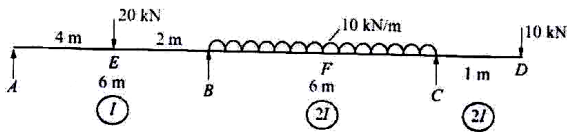
1. Explain the following : 4 × 5 = 20

- (i) A five story building is to be built in Delhi. The size of the proposed building is 50m × 100M. Compute the design wind pressure on the building if the height of the building is 25m.
- (ii) Why is the plastic method of design more useful for redundant structures than the determinate structure ?

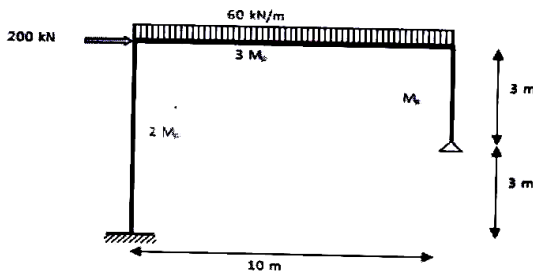
- (iii) The roof slope of a truss in an industrial building is $18^{\circ}20'$. Estimate the live load as per IS 875.
- (iv) A fixed ended cantilever beam is subjected to load W at $1/3$ rd from one end span. Estimate the collapse load.
- (v) Describe the different forces act on a transmission tower.

SECTION – A

2. Find out the collapse load for a continuous beam as shown in figure. Consider I as M_p . 20



3. A portal frame is shown in figure. Find the value of W at collapse. 20



SECTION – B

4. Analyze a steel roof truss as shown in fig. for a clear span of 18m. The truss is supported over masonry columns 45 cm × 45 cm. The trusses are placed 3m c/c and support galvanized iron sheet on rafters and steel purlins. The rise of the truss is 1/3 of span. The design wind pressure may be assumed to be 900 N/m². 20



5. Design an elevated rectangular steel tank with hemispherical bottom for 3,00,000 liters capacity. The tank has conical roof. The ring beam of the tank is at a height of 15m from the ground level. The tank is to be built at sonipat. Take $f_y = 250 \text{ N/mm}^2$. 20

SECTION – C

6. Design a self supporting steel stack located at Rohtak of height 100m above the foundation. The diameter of the cylindrical part of the chimney is 3.2m. The thickness of fire brick work lining is 120mm, and the lining is supported by stack throughout the height. The chimney has one breach opening, the topography at the site is almost flat, and the location is of terrain category 2. 20

7. What do you mean by microwave tower ? What are design procedure and specification for the design of microwave tower ? 20

SECTION – D

8. A hat of 100mm × 80mm × 4mm section with a 25mm lip is to be used as a concentrically loaded column of 4m effective length. Determine the allowable load. Take $f_y = 235 \text{ N/mm}^2$. 20
9. Design a 5.0m long column using cold formed section to carry a load of 180 kN Take $f_y = 250 \text{ N/mm}^2$. 20
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