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Printed Pages : 4 **CE – 041**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0040 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VIII) EXAMINATION, 2006-07

PLASTIC DESIGN OF STEEL STRUCTURES

Time : 3 Hours] *[Total Marks : **100***

Note : *Attempt **all** questions. All questions carry equal marks. IS : 800 and steel table can be used.*

1. Attempt any **four** parts of the following : **5×4=20**

(a) Explain shape factor ?

(b) Explain different methods of plastic analysis ?

(c) Draw stress stain curve for mild steel

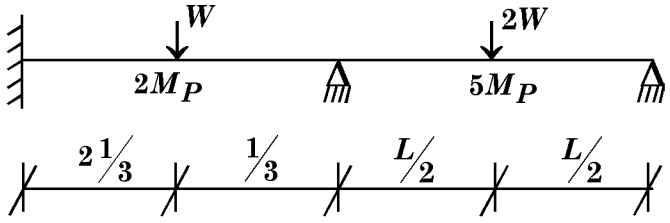
(d) Differentiate between real and plastic hinge.

(e) Calculate shape factors of a circle.

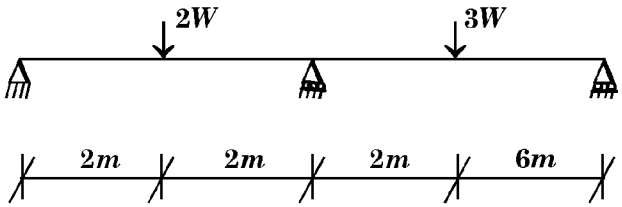
(f) Define load factor.

2. Attempt any **two** parts of the following : **10×2=20**

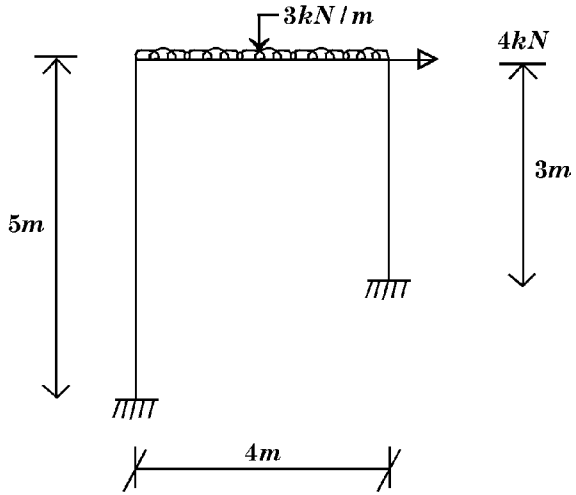
(a) Calculate ultimate load W_u for the two span beam with M_p values given below.



(b) Find collapse load for the beam shown below :



(c) For the frame shown below find the value of fully plastic moment required if all members have same value of M_p.



3. Attempt any **two** parts of the following : **10×2=20**

(a) Write design steps for plastic design of steel structures.

(b) Show the effect of axial force on fully plastic moments.

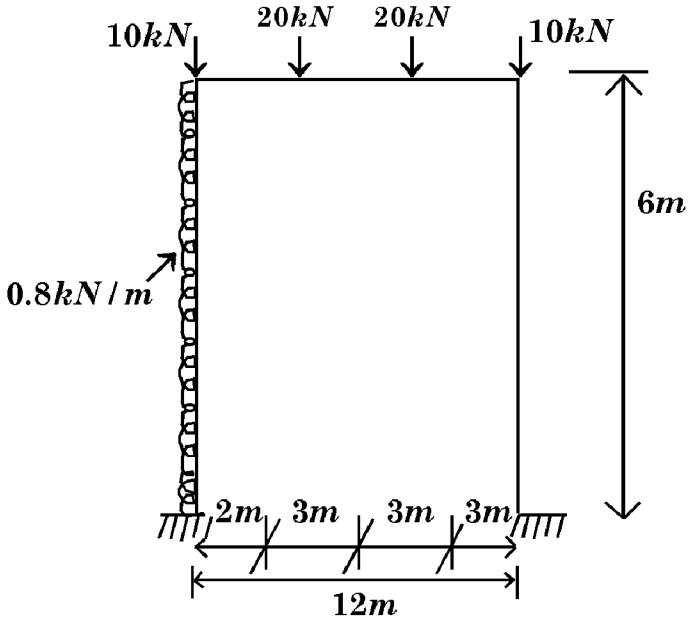
(c) Explain how the plastic moment capacity is affected by shear force.

4. Using plastic design concept, design the following : **20×1=20**

A continuous beam of uniform section is required over four span of 8 m each. The working load is 20 kN/m including self weight of the beam. Determine a suitable section for the beam.

OR

A building consists of uniform portal frames with fixed bases having 12 m span and 6 m height. The frames are spaced 4 m apart. The roof consists of beams and concrete slab such that the load on the frame is shown below. The wind load on side may be taken as 1.2 kN/m$^{2.}$ Design the portal frame. Assume the frame to be laterally supported and use a uniform load factor of 1.7.

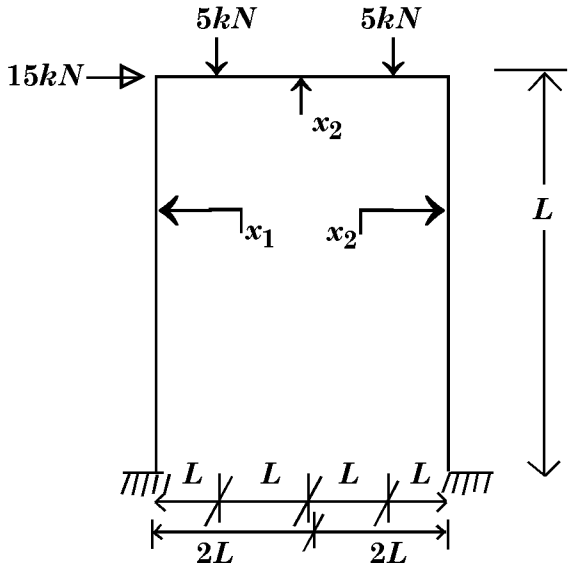


5. Attempt any **two** parts of the following :

(a) Describe different methods of solution of minimum weight design.

(b) Explain minimum weight theorem and its application.

(c) Figure given below shows a frame with loading.



Assuming members of uniform sections with plastic moments x_1 and x_2 as shown design the frame for minimum weight.