Printed Pages: 5 NCE-042

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

Paper ID : 2295035 Roll No. | | | | | | | | | |

B.TECH

Regular Theory Examination(Odd Sem- VII) 2016-17

PLASTIC ANALYSIS OF STRUCTURES

Time : 3 Hours *Max. Marks : 100*

Note : Attempt all Section. If require any missing data; then choose suitably.

SECTION - A

1. Attempt **all** question in brief. **(10×2=20)**

a. What is elastic limit?

b. Write down the assumptions made to evaluate the fully plastic moment of a section.

c. State uniqueness theorem.

d. Differentiate between plastic modulus and section modulus.

e. What are the limitations of load factor concept?

f. What do you mean by plastic hinge?

g. Write the effect of shear.

h. What do you mean by redundant force?

i. Define flexure of beam.

j. Find the shape factor of a circle section.

SECTION - B

2. Attempt any three of the following : (3×10=30)

a. A propped cantilever of 4 m long carries a uniformly distributed load of 24 KN/m. A 224 mm × 150 mm joint, (thickness of flang 9.9 mm and thickness of web 6.4 mm) is used for the beam calculate the load factor, taking the yield stress as 260 N/mm^2. State the location of the plastic hinge in the span at collapse loading.

b. A propped cantilever of uniform Mp is with UDL, find the collapse load loaded.

c. Discuss semi - graphical method with the help of an example.

d. Explain in detail plastic moment distribution of multi - storey and multi - bay frames.

e. Discuss effect of shear force on plastic moment capacity.

SECTION - C

3. Attempt any one part of the following : (1×10=10)

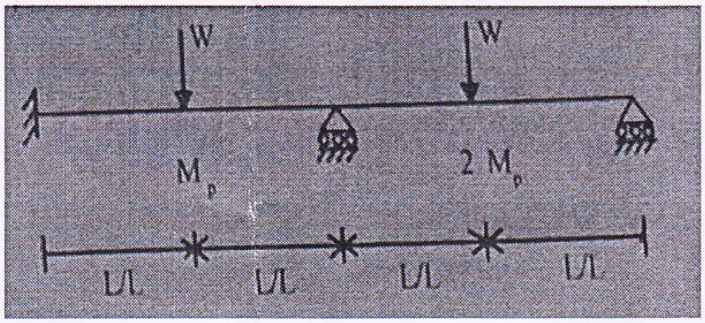
a. I. How will you find plastic moment capacity for any cross - section?

II. Calculate shape factor of a rectangle.

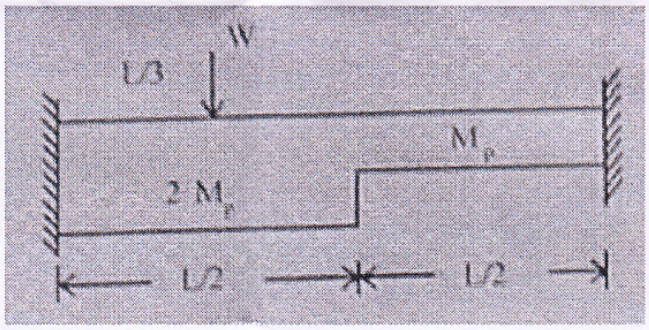
b. Define plastic moment. Explain plastic failure.

4. Attempt any one part of the following : (1×10=10)

a. Calculate ultimate load Wu for the two span beam with Mp values given below :



b. A fixed ended beam is subjected to load W at 1/3rd span as shown in Estimate the collapse load.



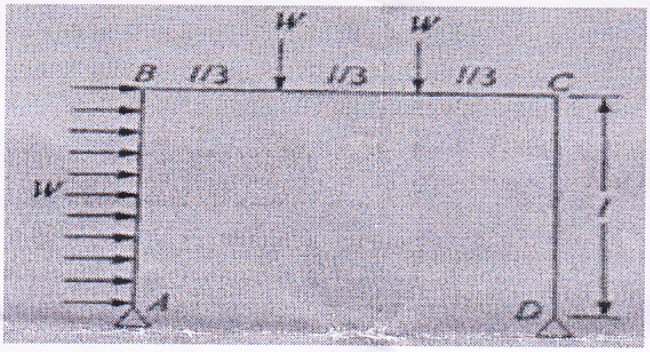
5. Attempt any one part of the following: (1×10=10)

a. Discuss the mechanism involved in the kinematics method of plastic analysis. For evaluating which parameters, you will use this method. A fixed beam is subjected to an UDL 'w' acting throughout the span of length 'L'. Using the mechanism method, compute the ultimae load.

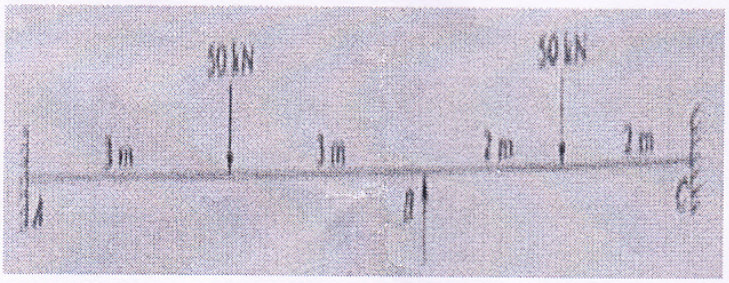
b. What are the two methods of plastic analysis by which the collapse load can be determined?

6. Attempt any one part of the following : (1×10=10)

a. For the two hinged portal frame loaded as shown in figure. Find the value at collapse. Assume that the plastic moment of resistance Mp is same for all the members.



b. Figure shows a two span continuous beam of uniform section having a plastic moment Mp equal to 60 KN-m. Determine the collapse mechanism and the load factor. The given loads are working loads.



7. **Attempt any one part of the following : (1×10=10)**

a. Explain how the plastic moment capacity is affected by the axial forces acts on the structure? A fixed beam of length 'L' is subjected to a concentrated load 'W', at 'L/4' from one end. Compute the ultimate deflection.

b. A continuous beam ABCD consists of three equal spans of length 6 m. The end A is fixed while simple supports are provided at B, C and D. The beam is subjected to the collapse load system shown in figure. Find the plastic moments required for each span, for the condition of simulataneous collapse of all the spans. Assume that the section for the middle span is lighter than the sections of the outer spans.