

# DEPARTMENT OF CIVIL ENGINEERING, IIT DELHI

## MINOR II :CVL756 ADVANCED STRUCTURAL ANALYSIS (2020-21)

Time allowed: 45 mins

Date: 31 Dec 2020

Venue: Online

Max marks : 20

NOTE: (a) All questions are compulsory. (b) Draw neat and clear sketches wherever required.  
(c) Assume suitable data if necessary. (d) Assume members as extensible unless otherwise stated.  
(e) All answers must be supported by calculations/ justification to secure assigned marks.

Q1.

For the frame shown in Figure1, which has the plastic moment capacity of columns  $M_p$  and that of the beam  $2 M_p$ :

- Draw the "combined mechanism" clearly showing all virtual displacements/rotations
- Obtain the ultimate collapse load for this mechanism

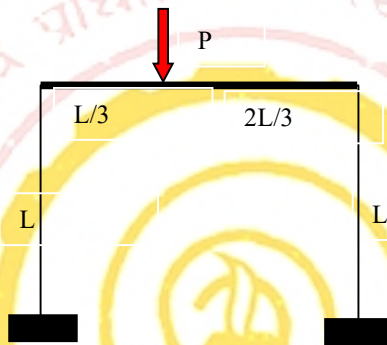


Figure 1

(10 marks)

Q2.

Use the matrix flexibility approach to obtain the deflection of the frame to the right. All members are of length  $L$  and possess same  $EI$  value.

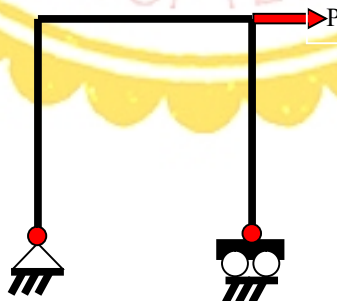


Figure 2

(10 marks)