!PLANE182: 4-nodes, 2D element, 2DOF/NODE (UX,UY)

!Aluminum, E=10E6, Poisson’s ratio 0.33

!Units are mm and N (therefore, E and stress are MPa)

!Cantilever beam

FINISH !Finishes any previous activity

/CLEAR !Clears any previous activity

/BATCH !Works in “batch” mode

/PREP7

!Define geometry and load parameters.  
LENGTH=100

HEIGHT=20

THICKNESS=40

LOAD=-5000

ET,1,PLANE182

MP,EX,1,10E6 !Young’s modulus

MP,PRXY,1,0.33

KEYOPT,1,3,3 !Use plane stress (through the thickness)

R,1,THICKNESS !Use “THICKNESS” as the through thickness dimension

!Define locations of key points. Include KP’s at 10mm from attachment for easier analysis of stress through that section.

K,1,0,0,0

K,2,0,HEIGHT,0

K,3,10,HEIGHT,0

K,4,LENGTH,HEIGHT,0

K,5,LENGTH,0,0

K,6,10,0,0

L,1,2 !Create a line connecting Key Points 1 and 2.

L,2,3

L,3,4

L,4,5

L,5,6

L,6,1

/PNUM,AREA,1

AL,ALL

SMRTSIZE,3

AMESH,ALL

FINISH

/SOLU

!Apply constraints along left edge

NSEL,S,LOC,X,0 !select all nodes along X=0

D,ALL,UX,0 !Prevents ALL displacement of selected nodes

D,ALL,UY,0

!Apply force at top right corner

FK,4,FY,LOAD

ALLSEL !Since we have used NSEL to select specific nodes, we now need ALLSEL to select all of the nodes

SOLVE

FINISH

/POST1

/ESHAPE,1 !Display element shapes using section data

/RGB,INDEX, 0, 0, 0,15 !set text color to black

/COLOR,WBAK,14 !Set background color to light grey

/DSCALE,ALL,1 !Plot using true scale

!/VIEW,1,1,1,1

FINISH !Finish and exit the post-processor

SAVE !Save the data base