

Question 1

For the beam shown in Figure 1, it has the cross-sectional area shown in Figure 2. Determine the displacements and the slopes at the nodes, and the reactions.

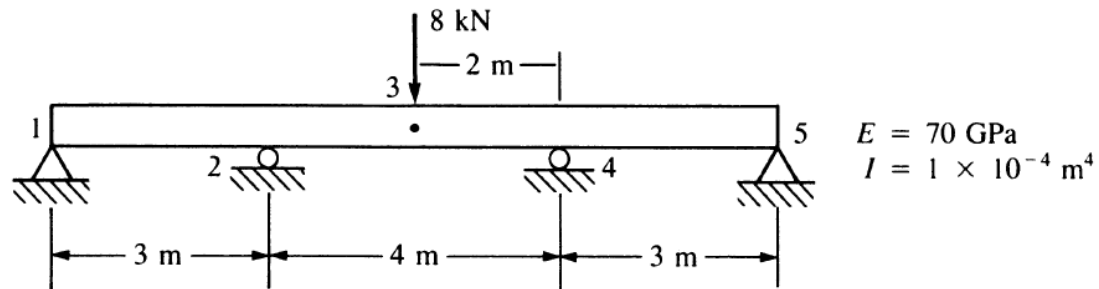


Figure 1

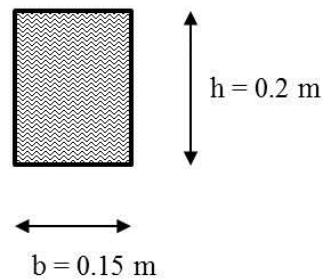


Figure 2



Unit

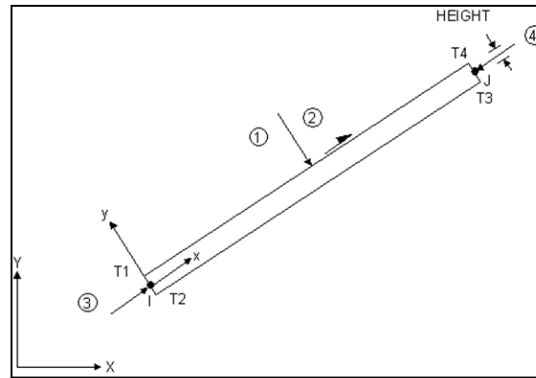
- Ansys had no build-in unit system
- The unit must be consistent.

Table 2-1 Consistent units.

Quantity	SI	SI (mm)	US Unit (ft)	US Unit (inch)
Length	m	mm	ft	in
Force	N	N	lbf	lbf
Mass	kg	tonne (10 ³ kg)	slug	lbf s ² /in
Time	s	s	s	s
Stress	Pa (N/m ²)	MPa (N/mm ²)	lbf/ft ²	psi (lbf/in ²)
Energy	J	mJ (10 ⁻³ J)	ft lbf	in lbf
Density	kg/m ³	tonne/mm ³	slug/ft ³	lbf s ² /in ⁴

BEAM 3

2-D elastic beam



Element Name	BEAM3
Nodes	I, J
Degrees of Freedom	UX, UY, ROTZ
Real Constants	AREA, IZZ, HEIGHT, SHEARZ, ISTRN, ADDMAS
Material Properties	EX, NUXY, GXY, ALPX, DENS, DAMP
Surface Loads	Pressure face 1, face 2, face 3, face 4
Body Loads	Temperature -- T1, T2, T3, T4
Special Features	Stress stiffening, Large deflection, etc.

/POST1

PRNSOL, U, SUM

! displacements

PRNSOL, ROT, COMP

! slopes

PRRSOL

! reactions

FINISH