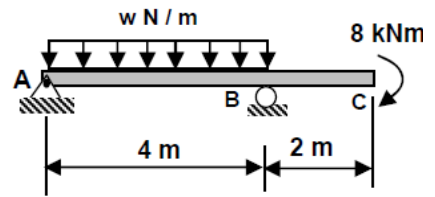# MECHANICS (ME10001)

Tutorial 12: Deflection of beams

1. An overhung beam of constant flexural rigidity EI, carrying uniform load of w N/m is shown in Figure. A moment of 8 kNm is applied at the beam end C, so that the displacement at C is zero. Calculate the magnitude of load intensity w.   [w = 7 kN/m]

w N / m

8 kNm

A

B

C

4 m

2 m

2. Determine the deflection at point A due to the applied loads for the beam. E = 200 GPa.   [5.74 mm]

60 kN/m

A

$I = 10^9$ mm^4

3 m

2 m
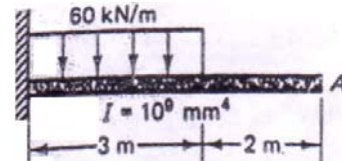
3. Determine the deflection at point A due to the applied loads for the beam. E = 200 GPa   [1.145 mm]

20 kN

A

$I = 80 \times 10^6$ mm^4

1 m

1 m

2 m
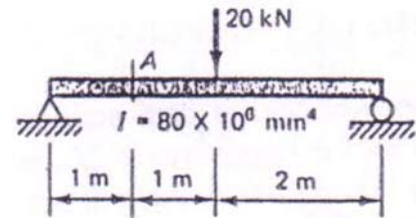
4. Determine the deflection at point A due to the applied loads for the beam. EI is constant throughout the beam length.   [832/(EI) m]

6 kN/m

A

10 m

4 m
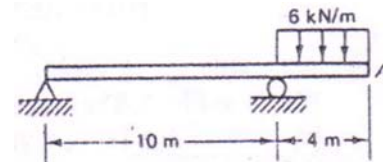
5. For the beam and loading shown, determine (a) the deflection at mid-span of *BC*, and (b) the slope at *B*. EI is constant throughout the beam length.
      [(a) 13wL^4/(1920EI); (b) wL^3/(120EI)]

$P = \dfrac{wL}{5}$

y

w

B

C

A

x

L/2

L
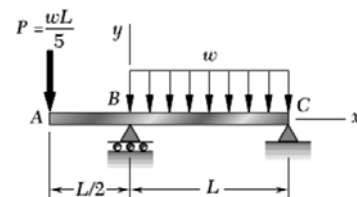
6. A cantilever beam of 5m length is loaded as shown. Calculate the deflection at the free end. The beam has uniform flexural rigidity as EI.   [1343.75/(EI) m]

15 kN/m

40 kN m

B

C

D

1·5 m

3 m

0·5 m

5 m