

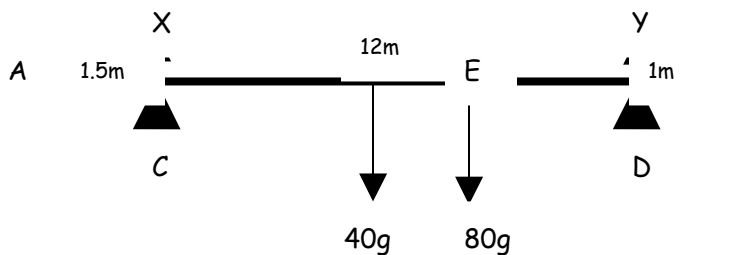
Moments

Uniform Beams

Example 6

A uniform beam AB of mass 40kg and length 12m is supported in a horizontal position at C and D, where AC = 1.5m and DB = 1m. A man of mass 80kg stands on the beam at the point E where EB = 2.5m. Find the reactions at C and D.

Examiners always suggest that a diagram is **VITAL**.



Resolving vertically gives:

$$X + Y = 120g \quad (1)$$

Taking Moments about C gives:

The mass of the beam gives a clockwise moment of: $40g \times 4.5 = 180gNm$

The mass of the man gives a clockwise moment of: $80g \times 8 = 640gNm$

The reaction at D gives an anticlockwise moment of: $9.5Y Nm$

Therefore:

$$9.5Y = 820g$$

$$Y = \frac{1640}{19}g = 845.9N$$

Using equation (1) from above

$$X + Y = 120g$$

$$X + 845.9 = 120g$$

$$X = 330N$$