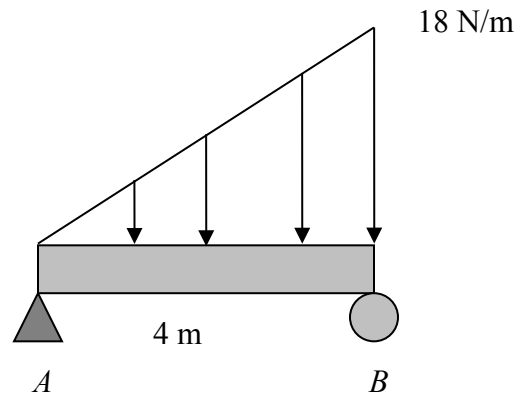**TOPIC**
Engineering Mechanics (Statics and Dynamics) – Section VII – Question 1

QUESTION

18 N/m

4 m

A   B

The beam is loaded as shown with a linearly distributed load. The beam is 4m long and its cross-sectional shape is $0.2m \times 0.2m$ square. The Young's modulus of the beam is 210 GPa, and Poisson's ratio is 0.3. The reaction at point A is most nearly
  (A) 12 N
  (B) 18 N
  (C) 24 N
  (D) 36 N

HINT
Sum the reactions at A and B to the applied load
Sum the moments at A or B.

SOLUTION
Total load $= 18 \times 4 \times \frac{1}{2} = 36$N
So the sum of the reactions at A and B is
$$R_A + R_B = 36$$
Summing the moments around point A gives,
$$R_B \times 4 - 36 \times \frac{2}{3} \times 4 = 0$$
$$R_B = 24N$$
With
$$R_B = 24N \text{ and}$$
$$R_A + R_B = 36N,$$
we get
$$R_A = 36 - 24$$
$$= 12N.$$

ANSWER

(A)

CONTRIBUTOR

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