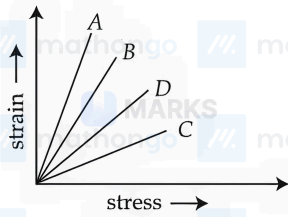


Q1. JEE Main 2026 (23 January Shift 1)

The strain-stress plot for materials A , B , C and D is shown in the figure. Which material has the largest Young's modulus ?

(1) D (2) B (3) C (4) A **Q2. JEE Main 2026 (28 January Shift 1)**

Two wires A and B made of different materials of lengths 6.0 cm and 5.4 cm , respectively and area of cross sections $3.0 \times 10^{-5}\text{ m}^2$ and $4.5 \times 10^{-5}\text{ m}^2$, respectively are stretched by the same magnitude under a given load. The ratio of the Young's modulus of A to that of B is $x : 3$. The value of x is _____.

(1) 2

(2) 1

(3) 4

(4) 5

ANSWERS AND SOLUTIONS

1. (3)

2. (4)

1. (3) Young's modulus (Y) is defined as the ratio of stress to strain: $Y = \frac{\text{stress}}{\text{strain}}$.

In the given graph, the y-axis represents strain and the x-axis represents stress.

The slope of the line in a strain-stress graph is given by $m = \frac{\text{strain}}{\text{stress}}$.

Therefore, $Y = \frac{1}{\text{slope}}$.

To have the largest Young's modulus, the material must have the smallest slope in the strain-stress plot.

From the figure, line C has the smallest angle with the stress axis (x-axis), meaning it has the minimum slope.

Since $Y \propto \frac{1}{\text{slope}}$, material C has the largest Young's modulus.

2. (4) Young's modulus: $Y = \frac{\sigma}{\epsilon} = \frac{F/A}{\Delta L/L}$.

When the same force is applied and both wires stretch by the same extension ΔL , the ratio of Young's moduli is:

$$\begin{aligned} \frac{Y_A}{Y_B} &= \frac{F/A_A}{\Delta L/L_A} \times \frac{\Delta L/L_B}{F/A_B} = \frac{A_B}{A_A} \times \frac{L_A}{L_B} \\ &= \frac{4.5 \times 10^{-5}}{3.0 \times 10^{-5}} \times \frac{6.0}{5.4} = 1.5 \times \frac{10}{9} = \frac{5}{3}. \end{aligned}$$

Therefore $x : 3 = 5 : 3$, giving $x = 5$.