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Kelas : XI 2. Jawaban tugas Elastisitas dan hukum Hooke!

### Jawaban Tugas Elastisitas dan hukum Hooke!

1. Diketahui :

$$d = 1,4 \text{ mm} = 1,4 \times 10^{-3} \text{ m}$$
$$r = 0,7 \times 10^{-3} \text{ m}$$
$$m = 100 \text{ g} = 0,1 \text{ kg}$$
$$g = 10 \text{ m/s}^2$$
$$x = 60 \text{ cm} = 0,6 \text{ m}$$
$$\Delta x = 0,3 \text{ mm} = 0,3 \times 10^{-3} \text{ m}$$

$$A (\text{luas Penampang Kawat}) = \pi r^2$$
$$A = \frac{22}{7} \times (0,7 \times 10^{-3})^2$$
$$A = 154 \times 10^{-9} \text{ m}^2$$

Jawab :

a) Tegangan

$$\sigma = \frac{F}{A} = \frac{(m \times g)}{A}$$
$$\sigma = \frac{(0,1 \times 10)}{(154 \times 10^{-9})}$$
$$\sigma = 6,5 \text{ N/m}^2$$

b) Regangan

$$\epsilon = \frac{\Delta x}{x} = \frac{(0,3 \times 10^{-3}) \text{ m}}{0,6 \text{ m}}$$

c) Modulus Elastisitas

$$E = \frac{\sigma}{\epsilon} = \frac{(6,5 \text{ N})}{\text{m}^2} \frac{1}{(5 \times 10^{-5})}$$

$$E = 1,3 \times 10^5 \text{ N/m}^2$$

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Diketahui :

$$L = 10 \text{ cm}$$

$$L_0 = 2,5 \text{ m}$$

$$L_1 = 2,7 \text{ m}$$

$$X = 4,10^3 \text{ N/M}^2$$

$$g = 10 \text{ m/s}^2$$

Ditanya : m....?

$$Y = \frac{F \times L_0}{A \times \Delta L}$$

$$\Delta L = L_1 - L_0$$

$$= 2,7 - 2,5$$

$$= 0,2 \text{ m}$$

$$A = \frac{1}{4} \pi D^2$$

$$= \frac{1}{4} \pi 10^2$$

$$= 2,5 \pi = 72,5332$$

$$= 78,540 \text{ cm}^2 = 78,54 \cdot 10^{-4} \text{ m}^2$$

$$Y = \frac{F \times L_0}{A \times \Delta L}$$

$$F = \frac{Y \times A \times \Delta L}{L_0} = \frac{4 \cdot 10^3 \times 78,54 \cdot 10^{-4} \cdot 0,2}{2,5}$$

$$= 2,513 \text{ N}$$

$$F = M \cdot g$$

$$M = \frac{F}{g} = \frac{2,513}{10}$$

$$= 0,251 \text{ kg}$$

$$\begin{aligned} 3 &= \frac{1}{k_1} + \frac{1}{k_2} + \frac{1}{k_3} \\ &= \frac{1}{100} + \frac{1}{150} + \frac{1}{300} \\ &= \frac{3 + 2 + 1}{300} \\ &= \frac{6}{300} \end{aligned}$$

$$k = \frac{300}{6} = 50 \text{ N/M}$$

4. Dik :  $k = 300 \text{ N/M}$   
 $m = 6 \text{ kg}$   
 $g = 10 \text{ m/s}^2$   
ditanya :  $x \dots ?$

Jawab :

$$x = \frac{F}{k}$$

$$x = \frac{(m \cdot g)}{k}$$

$$x = \frac{(6 \cdot 10)}{300}$$

$$x = \frac{60}{300}$$

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5  $l_x = 1 \text{ m}$

$$l_y = 2 \text{ m} = 2l_x$$

$$\Delta l_x = 0.5 \text{ mm}$$

$$\Delta l_y = 1 \text{ mm} = 2 \Delta l_x$$

$$d_y = 2d_x$$

$$E_x : E_y = ?$$

$$E_x : E_y$$

$$\frac{F_{ix}}{A_x \Delta l_x} = \frac{F_{iy}}{A_y \Delta l_y}$$

$$\frac{F_{ix}}{\pi \frac{1}{4} d_x^2 \Delta l_x} = \frac{F_{iy}}{\pi \frac{1}{4} d_y^2 \Delta l_y}$$

$$\frac{l_x}{d_x^2 \Delta l_x} = \frac{l_y}{d_y^2 \Delta l_y}$$

$$\frac{l_x}{d_x^2 \Delta l_x} = \frac{2l_x}{(2d_x)^2 2\Delta l_x}$$

$$\frac{1}{d^2} = \frac{2}{4d^2 2}$$

$$\frac{1}{1} = \frac{1}{4}$$

$$E_x : E_y = 4 : 1$$

Siap terima kasih banyak bapa