

Pre-lab 4:

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1. Do you think the radius and length of the wire would change the rigidity modulus? Explain your answer.

No, the rigidity modulus (η) is a property of material, means it only depends on the material type, not on the dimension of wire. However, from the formula, $\eta = \frac{8\pi I \lambda}{T^2 \pi^4}$; the experimental measure can differ by deviation on error calculating of dimensions. But they doesn't alter the actual rigidity modulus.

2. How the moment of inertia of the cylinder would change with its radius?

The moment of inertia (I) of a solid cylinder about its axis, $I = \frac{1}{2} M r^2$; here m is mass and r is radius. From this, $I \propto r^2$; means the mass (M) constant. The moment of Inertia (I) increases if r increases, and decrease if r decreases.

3. Do you think, we would get the similar results for the rigidity modulus, if we use a circular disc instead of cylindrical mass? Explain your answer.

Yes, the results will be similar.

1. The rigidity modulus (η) depends on the wire, not the object (disc or cylinder) attached to it.

2. Both cylinder and disc use same formula for their moment of Inertia (I) = $\frac{1}{2} M R^2$.

So, final calculated result for η will be same.