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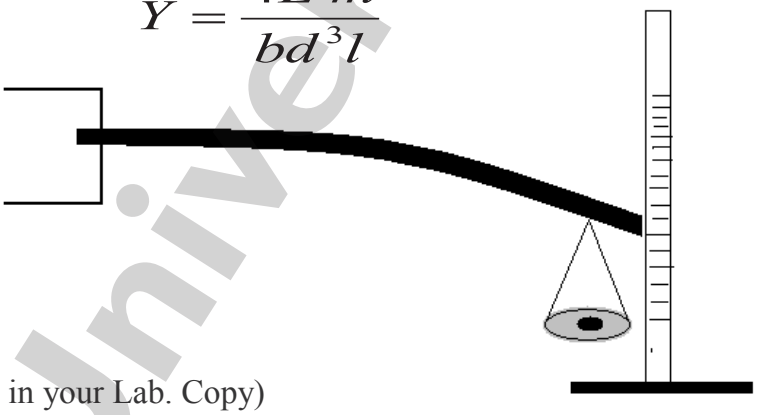
1.0 EXPERIMENT NO: BNS/103a/01
2.0 NAME OF EXPERIMENT: YOUNG'S MODULUS
3.0 0BJECTIVE:DETERMINATION OF YOUNG'S MODULUS BY CANTILEVER METHOD

4.0 PRINCIPLE: If a light bar of breadth b and depth d is placed horizontally whose one end is fixed at a point and a load of mass m is applied at the other end point of the bar at a distance L, produce a depression l of the bar, then Young's modulus Y of the material of the cantilever beam is given by -

$$Y = \frac{4L^3 m}{bd^3 l}$$



5.0 TOOLS/APPARATUS REQUIRED:
5.1 cantilever beam
5.2 Scale with stand
5.3 Hanger
5.4 Slotted weight

6.0<u>PROCEDURE:</u> (don't write the procedure in your Lab. Copy)

At first measure the length of the cantilever beam.

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Determine the vernier constant of the slide calipers and measure the breadth of the beam

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Determine the least count of a screw gauge and measure the depth of the beam

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Record the readings with zero load on the hanger at the free end of the cantilever beam with the help of scale attach in a stand.

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Place a load on the hanger at the free end of the cantilever bar .this will produce a depression on the bar .the difference of the two scale reading gives the depression of the beam

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Increase gradually the load and at each step record the scale reading.
Collect the data up to 5 loads and each case take the depression of the beam

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Remove the load one by one and each case record the data continues the process up to the readings for the hanger with no load.

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Determine the mean depression for increasing and decreasing load.

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7.0 Tabulation:

TABLE-1
Vernier constant (V.C.) of the slide calipers
10 divisions(say m) of the vernier scale=9 divisions (say n) of the main scale

Value of 1 smallest main scale division (l_1) (cm)	**Value of 1 division of the vernier scale $\frac{n}{m}$ (cm)**	**Vernier constant (v.c.) $(1-\frac{n}{m}) \times l_1$ (cm)**

TABLE-2
Measurement of breadth (b) of the bar by slide calipers

No of obs.	Reading of the		Total reading (cm) $m_s + v_s \times$ v.c.	Mean b (cm)	Instrumental error (cm)	Correct b (cm)
	Main scale (cm) m_s	Vernier no. v_s				
1						
2						
3						

TABLE-3
Least count (l.c.) of the screw gauge

Pitch of the screw P (cm)	No. of division of the circular scale n	Least count = p/n (cm)

TABLE-4
Measurement of depth (d) by screw gauge

No of obs.	Reading of the		Total reading (cm) $m_s + c_s \times$ l.c.	Mean d (cm)	Instrumental error (cm)	Correct d (cm)
	Main scale (cm) m_s	Circular scale no. c_s				
1						
2						
3						

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TABLE-5
Determination of load v.s depression data
Used length L = (c.m.)

No of obs.	Load applied (m) (gm)	Scale reading			Depression (l) (cm)
		Scale reading during increasing load (a) (cm)	Scale reading during decreasing load (b) (cm)	Mean Scale reading $\frac{(a+b)}{2}$ (cm)	

Draw a graph with load in X axis and depression in Y axis from **TABLE-5**

TABLE-6
Determination of Young's Modulus

Value of L (m)	Value of b (m)	Value of d (m)	Value of m from graph (k.g.)	Value of l from graph (m)	Young's Modulus Y N/m^2

8.0 Discussion:

You have to write all the difficulties you faced during the experiment and their remedies. Also you have to mention some way out that one should adopt during the practical to have a better result.