STUDY OF YOUNG'S MODULUS OF DIFFERENT WOODS

PROJECT REPORT

Submitted by

GAYATHRY T U

(AB23PHY006)

Under the guidance of

Dr. Susan Mathew

Assistant Professor,

Department of Physics and Centre for Research,

St. Teresa's College (Autonomous), Ernakulam.

In partial fulfilment of the requirement of award of Bachelor Degree of science in Physics.

ST. TERESA'S COLLEGE (AUTONOMOUS), ERNAKULAM

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ST. TERESA'S COLLEGE(AUTONOMOUS), ERNAKULAM

CERTIFICATE

This is to certify that the project report entitled "**STUDY OF YOUNG'S MODULUS OF DIFFERENT WOODS**" is an authentic work done by GAYATHRY T U, St. Teresa's College, Ernakulam, under my supervision at Department of Physics and Centre for Research, St. Teresa's College, Ernakulam, for the partial requirements for the award of Degree of Bachelor of Science in Physics during the academic year 2025-26. The work presented in this dissertation has not been submitted for any other degree in this or any other university.

Susan Mathew

Supervising Guide

Dr. SUSAN MATHEW

Assistant Professor.

St. Teresa's College (Autonomous) ★ Department of Physics ★ Ernakulam

Head of the Department

Dr. MARY VINAYA

Assistant professor.

ST. TERESA'S COLLEGE (AUTONOMOUS) ERNAKULAM

B.Sc. PHYSICS
PROJECT
REPORT

NAME : GAYATHRY T U

REGISTER NUMBER: AB23PHY006

YEAR OF WORK : 2025-26

This is to certify that this project work entitled, **"STUDY OF YOUNG'S MODULUS OF DIFFERENT WOODS"** is an authentic work done by GAYATHRY T U

Susan Mathew

Staff member in-charge

Dr. SUSAN MATHEW

St. Teresa's College (Autonomous) ★ Department of Physics ★ Ernakulam

Head of the Department

Dr. MARY VINAYA

Submitted for the University examination held at St. Teresa's College, Ernakulam.

DATE: 16.04.26

EXAMINER: ATHIRA PRAKASH

DECLARATION

I, GAYATHRY T U final B.Sc. Physics student, Department of Physics, St. Teresa's College (Autonomous), Ernakulam, do hereby declare that the project work entitled "**STUDY OF YOUNG'S MODULUS OF DIFFERENT WOODS**" has been originally carried out under the guidance and supervision of **Prof. Dr. Susan Mathew**, Assistant Professor, Department of Physics, St. Teresa's College (Autonomous), Ernakulam, in partial fulfilment for the award of the Degree of Bachelor of Physics. I further declare that this project is not partially or wholly submitted for any other purpose and the data included in the project is collected from various sources and is true to the best of my knowledge.

Place : Ernakulam

Date :

ACKNOWLEDGEMENT

I am extremely thankful to my project guide **Prof. Dr. Susan Mathew** whose immense support and valuable ideas helped me to make this project.

i would like to express my sincere gratitude to the head of department of physics **Prof. Dr. Mary Vinaya** for her esteemed guidance and encouragement.

i would also like to thank and express my heartfelt acknowledgements to our lab assistant Mr. Pearl who've always been there to help me throughout.

i sincerely thank everyone who've helped and encouraged me to make this project a reality.

ABSTRACT

The project investigates Young's modulus (E) of different wood materials using two experimental techniques:

- Optic lever method
- Cantilever method

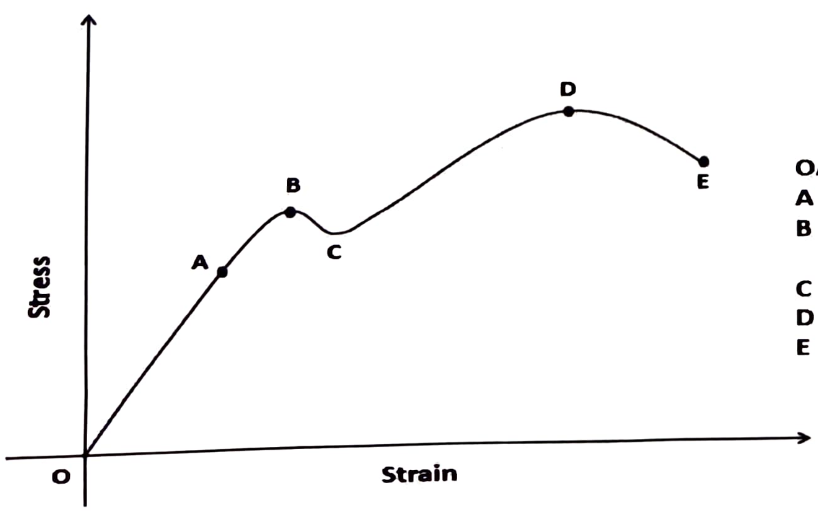
Young's modulus is a fundamental mechanical property that measures the stiffness of a material, defined as the ratio of stress to strain within the elastic limit. Young's modulus plays a crucial role in practical design and analysis. It has wide applications in Structural Engineering, Material Selection, Civil engineering, Mechanical Engineering, Aerospace & Automotive etc. The experimentally obtained values of Young's modulus for tested materials were found to be in close agreement with standard tabulated values. This validates the accuracy of both methods and demonstrates their reliability for material characterization.

CONTENT

CHAPTER 1
INTRODUCTION

In Physics, elasticity is the tendency of solid materials to return to their original shape after being deformed. Solid objects will deform when forces are applied on them. If the material is elastic, object will return to its initial shape and size when these forces are removed.

Bodies which completely regain their original condition on the withdrawal of the deforming forces are said to be perfectly elastic. Bodies which completely retain their modified form even after the withdrawal of the deforming forces are said to be perfectly elastic. There is a maximum value for the deforming force which the body ceases to be elastic. There is a There is a maximum value for the deforming force is called the elastic limit of the body. If deformed beyond the elastic limit, the body will not completely recover its original size or shape on the removal of deforming forces. Then, the body is said to have acquired a permanent set. If the stretching force on a wire is increased beyond the elastic limit, the extension increases very rapidly and the begins to thin down. The is called the yield point. If the stretching force is further increased, the wire snaps. This is called the breaking point.



OA : Proportional limit
A : Elastic limit
B : Yield stress point/upper yield stress point
C : Lower yield stress point
D : Ultimate stress point
E : Breaking or rupture point

The relation between stresses by strain is explained in Hooke law. It is the basic law of elasticity established by Robert Hooke in1678. It states that within elastic limit, stress is proportional to the strain. Stress is defined as the restoring force set up inside the body per unit area and its unit is Newton/m^2.Strain is the ratio of the change in any dimension of a body to the original dimension and it is dimensionless.

The ratio (stress/strain) is a constant and known as modulus of elasticity and its unit is Newton/m^2. Its value depends on the nature of material and is independent of the magnitudes of the stress and strain. The dimension of modulus of elasticity is $[M^1L^{-1}T^2]$

Elastic modulus or Young's modulus or tensile modulus or, is a measure of the stiffness of an elastic material and is a quantity used to characterize the material. It is named after Thomas young's, the British Scientist. However, the concept was developed in 1727 by Leonhard Euler, and the first experiment that used the concept of Young's modulus in its current form was performed by the Italian scientist Giordano Rickety. If a force is applied on a wire so as to stretch it, then the force per unit area is called the longitudinal stress. The ratio of the increase in length to the original length of the wire is called the linear strain or longitudinal strain. Within elastic limit, the ratio of the longitudinal stress to the longitudinal strain is called Young's modulus.

$$Young's\ modulus, Y = \frac{Longitudinal\ stress}{\text{linear strain}}$$

$$Longitudinal\ stress = \frac{Force}{\text{Area}}$$

$$Linear\ Strain = \frac{Change\ in\ Length}{\text{Original Length}}$$

CHAPTER 2
EXPERIMENTAL TECHNIQUES

In this project, two different methods are employed to determine the Youngs modulus of different materials. The methods are (i) Uniform Bending-Optic Lever Method and (ii) Cantilever Method. The advantage of employing two methods is to ensure the accuracy of the result.

(i) UNIFORM BENDING-OPTIC LEVER METHOD

In uniform bending - Optic Lever Method,

$$Young's\ modulus, Y = \frac{Mgpl^2}{8Ie}$$

Where l = length of the bar between two knife edges, p=distance of each load from the nearer knife edge e = elevation of the center due to load and I the geometrical moment of inertia of the sectional area of the bar and for rectangular cross section,

$$I = \frac{bd^3}{12}$$

Where where b the breadth and d the thickness of bar. Hence

$$Young's\ modulus, Y \ = \frac{3Mgpl^2}{2\mathrm{bd}^3\mathrm{e}}$$

Here, the elevation is measured using optic lever, scale and telescope arrangement. If 's' is the shift in scale reading due to the load M, D is the distance of the scale from the mirror and 'a' is the length of the optic lever,

$$e \ = \frac{as}{2\mathrm{D}}$$

$$Young's\ modulus, Y \ = \frac{3MgpDl^2}{\mathrm{bd}^3\mathrm{as}}$$

Keeping D fixed, the term $\frac{l^2}{s}$ is a constant for different values of L.

Procedure

The telescope is focused on the image of the scale in the mirror. With the weight hangers alone (dead load) on either side, the telescope is adjusted to make the horizontal cross-wire 6coincides with any scale division. The telescope reading is noted. The load is increased in equal steps of 50gms and the telescope reading noted each time. After the maximum load has been added, the load is decreased in equal steps of 50gms; then, again noting the telescope reading. The average telescope reading for each load is found. The mean shift in telescope reading(S) for a constant load (M) is calculated. The length (l) of the bar between the knifes edges is measured (l^2/s) is calculated. The distance (D) of the scale from the mirror and the distance (P) of the weight hanger from the knife edges are also measured.

The experiment is repeated by changing *l*, by keeping P and D constant. In each case, the shift in telescope reading S for the same constant load M and hence (l/s) are calculated. (l^2/s) is found to be a constant. The mean value of (l^2/s) is obtained. The impression of the legs of optic lever is taken on a paper. The perpendicular distance of the single leg from the line joining the other two legs is measured as 'a' this is the length of the optic lever. The breadth (b) is measured using vernier calipers and thickness(d) Using screw gauge. Hence the young's modulus is calculated.

(ii) CANTILEVER METHOD

The angle between tangents at the clamped end and loaded end is given by,

$$\theta = \frac{Mgl^2}{2YI}$$

Where m is the mass producing the angle θ, l is the length of cantilever, Y is th Young's modulus of the material of the cantilever, I is geometric moment of inertia of the bar. For a rectangular bar $I = \frac{bd^3}{12}$. where b is the breadth and d is the thickness of the bar. When mirror and telescope arrangement is used, $\theta = \frac{s}{2D}$. when s is the shift in the scale reading for a mass M and D is the distance between the scale and mirror. Substituting for I and θ, $\boldsymbol{Y} = \frac{12MgDl^2}{bd^3s}$.

Procedure

The given uniform bar is clamped tightly on a table, so that a suitable length of it is projecting beyond the edge of table. A weight hanger is suspended from a point B is measured. A plane mirror strip is fixed vertically above the point B. A scale and telescope arrangement is setup in front of the mirror strip at a distance of about 1 m from it. The telescope is focused on the image of the scale in the mirror.

The cantilever is brought to the elastic mood by loading and unloading in steps of a number of times. With a suitable dead load W_o on the weight hanger, the scale reading at the horizontal cross wire of the telescope is taken. Then slotted weights (each of mass m) are placed successively in the weight hanger and in each case; the telescope reading is taken. The weights are removed one by one and readings are again taken. From these readings, the shift s in the scale reading for a mass m is determined. The distance D between the scale and the mirror is measured. The experiment is repeated for different values of l and in each case $\frac{l^2}{s}$ is calculated. It is found to be a constant.

CHAPTER 3

OBSERVATIONS

1.TEAK

BREADTH USING VERNIER CALLIPER

Value of a main scale division= 0.1cm

Number of divisions on vernier scale, n = 10 div

$$least\ count\ (lc) = \frac{\text{Value of a main scale division}}{n} = 0.01cm$$

Trial no.	MSR (x)	VSR (y)	TR=x+(yx *lc*)	Mean
	cm	div	cm	10^{-2} m
1.	2.8	8	2.88	
2.	2.8	6	2.86	
3.	2.8	9	2.89	2.868
4.	2.8	6	2.86	
5.	2.8	5	2.85	

THICKNESS USING SCREW GAUGE.

Pitch of the screw Gauge = 1mm

Number of divisions on head scale, n = 100 div

$$least\ count = \frac{\text{Pitch}}{n} = 0.01mm$$

Zero correction = +2

Trial no.	PSR	HSR	Corrected HSR	TR=PSR + (Corrected HSR x lc)	Mean Thickness
	mm	div	div	mm	10^{-3} m
1	5	31	33	5.33	
2	5	37	39	5.39	
3	5	40	42	5.42	5.396
4	5	33	35	5.35	
5	5	47	49	5.49	

UNIFORM BENDING-OPTIC LEVER METHOD							
Length	Load	Telescope Reading			Shift for 150 gm	Mean shift (s)	(l^2/s) x 10^2
		Loading	Unloading	Mean			
m	gm	cm			cm	cm	m
0.60	Wo	40	40	40	4.65	4.633	7.7689
	Wo+50	38.5	38.4	38.45	4.65		
	Wo+100	37	36.8	36.9	4.6		
	Wo+150	35.4	35.3	35.35			
	Wo+200	33.9	33.7	33.8			
	Wo+250	32.4	32.2	32.3			
0.40	Wo	19.5	19.5	19.5	2.8	2.85	7.1052
	Wo+50	18.6	18.5	18.55	2.85		
	Wo+100	17.7	17.6	17.65	2.9		
	Wo+150	16.8	16.6	16.7			
	Wo+200	15.8	15.6	15.7			
	Wo+250	14.8	14.7	14.75			

Mean l^2/s= 7.4371 m

$$Young's\ modulus, Y = \frac{3MgpDl^2}{bd^3as} = \frac{3x0.15x9.8x0.1x1x7.4371}{2.862x10^{-2}x(5.369x10^{-3})^3x0{,}045} = 1.617 \text{ x } 10^{10}\ \text{N}/m^2$$

CANTILEVER METHOD

Length	Weight	Unloading	Mean (cm)	Shift for 150 gm	Mean shift(s) X10^{-2}	$\frac{l^2}{s}$
m	gm	cm	cm	cm	m	m
0.24	Wo	29.3	29.25	1.25 1.3 1.3	1.2833	2.813
	Wo+50	29.7	29.7			
	Wo+100	30.3	30.2			
	Wo+150	30.5	30.5			
	Wo+200	31	31			
	Wo+250	31.5	31.5			
0.22	Wo	29	29	1.8 1.85 1.8	1.8166	2.4276
	Wo+50	29.8	29.8			
	Wo+100	30.4	30.35			
	Wo+150	30.8	30.8			
	Wo+200	31.7	31.65			
	Wo+250	32.2	32.15			

Mean l^2/s= 2.6203m

$$Young's\ modulus, Y = \frac{\mathbf{12MgDl^2}}{\mathbf{bd^3s}} = \frac{12x0.15x9.8x1x2.6203}{2.862x10^{-2}x(5.369x10^{-3})^3} = 1.0457 \times 10^{10}\ \mathrm{N/m^2}$$

2.KOYLA

BREADTH USING VERNIER CALLIPER

Value of a main scale division= 0.1cm

Number of divisions on vernier scale, n = 10 div

$$least\ count\ (lc) = \frac{\text{Value of a main scale division}}{n} = 0.01cm$$

Trial no.	MSR (x)	VSR (y)	TR=x+(yx *lc*)	Mean
	cm	div	cm	10^{-2} m
1.	2.7	7	2.77	2.77
2.	2.7	8	2.78	
3.	2.7	8	2.78	
4.	2.7	5	2.75	
5.	2.7	7	2.77	

THICKNESS USING SCREW GAUGE.

Pitch of the screw Gauge = 1mm

Number of divisions on head scale, n = 100 div

$$least\ count = \frac{\text{Pitch}}{n} = 0.01mm$$

Zero correction = +2

Trial no.	PSR	HSR	Corrected HSR	TR=PSR + (Corrected HSR x lc)	Mean Thickness
	mm	div	div	mm	10^{-3} m
1	7	4	6	7.06	7.064
2	7	8	10	7.1	
3	7	2	4	7.04	
4	7	4	6	7.06	
5	7	4	6	7.06	

UNIFORM BENDING-OPTIC LEVER METHOD							
Length	Load	Telescope Reading			Shift for 150 gm	Mean shift (s)	(l^2/s) x 10^2
		Loading	Unloading	Mean			
m	gm	cm			cm	cm	m
0.50	Wo	30.5	30.5	30.5	1.5	1.55	10.405
	Wo+50	30	30	30	1.55		
	Wo+100	29,5	29.4	29.45	1.6		
	Wo+150	29.1	28.9	29			
	Wo+200	28.5	28.4	28.45			
	Wo+250	27.9	27.8	27.85			
0.60	Wo	28.8	29	28.9	3	3.383	10.641
	Wo+50	28.1	28.2	28.15	3.6		
	Wo+100	27.3	27.2	27.25	3.55		
	Wo+150	25.1	25.3	25.2			
	Wo+200	24.6	24.7	24.65			
	Wo+250	23.7	23.7	23.7			

Mean l^2/s= 10.523m

$$Young's\ modulus, Y = \frac{3MgpDl^2}{bd^3as} = \frac{3x0.15x9.8x0.1x1x10.523}{2.77x10^{-2}x(7.064x10^{-3})^3x0{,}045} = 1.056* 10^{10} N/m^2$$

CANTILEVER METHOD

Length	Weight	Loading	Unloading	Mean (cm)	Shift for 150 gm	Mean shift(s) X10^{-2}	$\frac{l^2}{s}$
m	cm	cm	cm	cm	cm	m	m
0.19	Wo	26.9	26.9	26.9	0.85 0.85 0.8	0.8333	4.3333
	Wo+50	27,1	27.2	27.15			
	Wo+100	27.4	27.4	27.4			
	Wo+150	27.7	27.8	27.75			
	Wo+200	28	28	28			
	Wo+250	28.2	28.2	28.2			
0.22	Wo	27.4	27.4	27.4	1.05 1 1	1.0166	4.7609
	Wo+50	27.7	27.8	27.75			
	Wo+100	28	28	28			
	Wo+150	28.4	28.5	28.45			
	Wo+200	28.7	28.8	28.75			
	Wo+250	29	29	29			

Mean l^2/s= 4.5473m

$$Young's\ modulus, Y = \frac{12MgDl^2}{bd^3s} = \frac{12x0.15x9.8x1x4.5473}{2.77x10^{-2}x(7.064x10^{-3})^3}$$
$$= 0.8216 \times 10^{10}\ N/m^2$$

3. Mahagony

BREADTH USING VERNIER CALLIPER

Value of a main scale division= 0.1cm

Number of divisions on vernier scale, n = 10 div

$$least\ count\ (lc) = \frac{\text{Value of a main scale division}}{n} = 0.01cm$$

Trial no.	MSR (x)	VSR (y)	TR=x+(yx *lc*)	Mean
	cm	div	cm	10^{-2} m
1.	2.9	8	2.98	2.976
2.	2.9	8	2.98	
3.	2.9	8	2.98	
4.	2.9	7	2.97	
5.	2.9	7	2.97	

THICKNESS USING SCREW GAUGE.

Pitch of the screw Gauge = 1mm

Number of divisions on head scale, n = 100 div

$$least\ count = \frac{\text{Pitch}}{n} = 0.01mm$$

Zero correction = +9

Trial no.	PSR	HSR	Corrected HSR	TR=PSR + (Corrected HSR x lc)	Mean Thickness
	mm	div	div	mm	10^{-3} m
1	3	80	89	3.89	3.84
2	3	74	81	3.81	
3	3	79	88	3.88	
4	3	74	81	3.81	
5	3	78	87	3.87	

UNIFORM BENDING-OPTIC LEVER METHOD							
Length	Load	Telescope Reading			Shift for 150 gm	Mean shift (s)	(l^2/s) x 10^2
		Loading	Unloading	Mean			
m	gm	cm			cm	cm	m
0.50	Wo	33.7	33.8	33.75	11.6	11.566	2.1613
	Wo+50	30.1	30.2	30.15	11.6		
	Wo+100	25.3	25.2	25.25	11.5		
	Wo+150	22.1	22.2	22.15			
	Wo+200	18.5	18.6	18.55			
	Wo+250	13.7	13.8	13.75			
0.60	Wo	31.8	31.8	31.8	16.55	16.45	2.1884
	Wo+50	26.6	26.3	26.25	16.6		
	Wo+100	20.9	20	20.45	16.2		
	Wo+150	15.2	15.3	15.25			
	Wo+200	9.5	9.6	9.55			
	Wo+250	4.2	4.3	4.25			

Mean l^2/s = 2.17485 m

$$Young's\ modulus, Y = \frac{3MgpDl^2}{bd^3as} = \frac{3x0.15x9.8x0.1x1x2.17485}{2.976x10^{-2}x(3.84x10^{-3})^3x0,045} = 1.2649 \text{ x } 10^{10} N/m^2$$

CANTILEVER METHOD							
Length	Weight	Loading	Unloading	Mean (cm)	Shift for 150 gm	Mean shift(s) $X10^{-2}$	$\frac{l^2}{s}$
m	cm	cm	cm	cm	cm	m	m
0.24	Wo	4.5	4.5	4.5	6.7 6.7 6.6	6.667	0.863
	Wo+50	7.5	7.5	7.5			
	Wo+100	9.7	9.7	9.7			
	Wo+150	11.2	11.2	11.2			
	Wo+200	14.1	14.3	14.2			
	Wo+250	16.3	16.3	16.3			
0.22	Wo	18	18.2	18.1	5.7 5.7 5.7	5.7	0.8491
	Wo+50	19.8	20.1	19.95			
	Wo+100	21.9	22.9	22			
	Wo+150	23.7	23.9	23.8			
	Wo+200	25.6	25.7	25.65			
	Wo+250	27.6	27.8	27.7			

Mean l^2/s= 0.856 m

$$Young's\ modulus, Y = \frac{12MgDl^2}{bd^3s} = \frac{12x0.15x9.8x1x0.856}{2.976x10^{-2}x(3.84x10^{-3})^3}$$

$$= 0.8961 \text{ x } 10^{10} \text{ N/m}^2$$

4. Aanjilli

BREADTH USING VERNIER CALLIPER

Value of a main scale division= 0.1cm

Number of divisions on vernier scale, n = 10 div

$$least\ count\ (lc) = \frac{\text{Value of a main scale division}}{n} = 0.01cm$$

Trial no.	MSR (x)	VSR (y)	TR=x+(yx *lc*)	Mean
	cm	div	cm	10^{-2} m
1.	2.6	6	2.66	2.652
2.	2.6	5	2.65	
3.	2.6	4	2.64	
4.	2.6	6	2.65	
5.	2.6	5	2.65	

THICKNESS USING SCREW GAUGE.

Pitch of the screw Gauge = 1mm

Number of divisions on head scale, n = 100 div

$$least\ count = \frac{\text{Pitch}}{n} = 0.01mm$$

Zero correction = -1

Trial no.	PSR	HSR	Corrected HSR	TR=PSR + (Corrected HSR x lc)	Mean Thickness
	mm	div	div	mm	10^{-3} m
1	5	48	47	5.47	5.476
2	5	49	48	5.48	
3	5	48	47	5.47	
4	5	48	47	5.47	
5	5	50	49	5.49	

UNIFORM BENDING-OPTIC LEVER METHOD								
Length	Load	Telescope Reading			Shift for 150 gm	Mean shift (s)	(l^2/s) x 10^2
		Loading	Unloading	Mean			
m	gm	cm			cm	cm	m
0.55	Wo	31.6	31.7	31.65	6.5	6.25	4.84m
	Wo+50	29.5	29.5	29.5	6.05		
	Wo+100	27.8	27.9	27.85	6.2		
	Wo+150	25.1	25.2	25.15			
	Wo+200	23.5	23.4	23.45			
	Wo+250	21.6	21.7	21.65			
0.70	Wo	48.3	48.3	48.3	10.3	10.26	4.77
	Wo+50	45	44.8	44.9	10.2		
	Wo+100	41.6	41.3	41.45	10.3		
	Wo+150	38.1	37.9	38			
	Wo+200	34.8	34.6	34.7			
	Wo+250	31.2	31.1	31.15			
0.75	Wo	46.4	46.4	46.4	12.55	12.58	4.47
	Wo+50	42.5	42.1	42.3	12.6		
	Wo+100	38.4	38	38.2	12.6		
	Wo+150	34.1	33.6	33.85			
	Wo+200	29.9	29.5	29.7			
	Wo+250	25.7	25.5	25.6			

Mean l^2/s= 4.708m

$$\textit{Young's modulus}, Y = \frac{3MgpDl^2}{bd^3as} = \frac{3x0.15x9.8x0.1x1x4.708}{2.652x10^{-2}x(5.476x10^{-3})^3x0{,}045} = 1.0594 \text{ x } 10^{10} N/m^2$$

CANTILEVER METHOD							
Length	Weight	Loading	Unloading	Mean (cm)	Shift for 150 gm	Mean shift(s) $X10^{-2}$	$\frac{l^2}{s}$
m	cm	cm	cm	cm	cm	m	m
0.23	Wo	29	29	29	3.2	3.2166	1.6445
	Wo+50	30.4	30.4	30.4	3.2		
	Wo+100	31.1	31.1	31.1	3.2		
	Wo+150	32.1	32.3	32.2			
	Wo+200	33.5	33.7	33.6			
	Wo+250	34.3	34.4	34.35			
0.17	Wo	29.8	30	29.9	1.5	1.5166	1.9055
	Wo+50	30.2	30.4	30.3	1.5		
	Wo+100	30.8	31	30.9	1.55		
	Wo+150	31.4	31.4	31.4			
	Wo+200	31.7	31.9	31.8			
	Wo+250	32.4	32.5	32.45			

Mean l^2/s= 1.77525 m

$$Young's\ modulus, Y = \frac{12MgDl^2}{bd^3s} = \frac{12x0.15x9.8x1x1.77525}{2.652x10^{-2}x(5.476x10^{-3})^3}$$

$$= 0.8191 \text{ x } 10^{10} \text{ N/m}^2$$

CHAPTER 4
RESULT & DISCUSSION

Wood	Young's modulus 10^{10} N/m^2		
	Optic liver	Cantilever	Standard value
TEAK	1.622	1.0257	1 – 1.67
KOYLA	1.056	0.8216	
MAHOGANY	1.256	0.8961	0.79 – 1.02
ANJILLI	1.059	0.8191	1.045 – 1.224

Young's modulus of material of different woods is studied and it can be concluded that young's modulus varies with respect to the material selected. There is a wide range of applications for young's modulus;Elasticity is used widely in design and analysis of structure such as beams, plates, and shells, sandwich composites. This is also the basis of much of fracture mechanics.

Elasticity is primarily used to determine the response of elastomer- based objects such as gaskets and of biological materials such as soft tissues and cell membrane.

Young's modulus allows the behavior of material under load to be studied. For it can be used to predict the amount a wire will extend under tension or to predict the load at which a thin column will buckle compression by measuring the properties such as young's modulus, rigidity modulus, etc. of kinds woods, a great deal of uncertainty can be removed from the building processes. Young's modulus of different woods is useful especially in the field of construction works.

References

1. *An advance course in practical physics by D. Chattopadhyay and P.C Rakshit*

2. *Properties of matter by D.S Mathur*