OBSERVATIONS:

Table 1: Measurement of *l* and T using first pendulum.

(a) Position of CG of the bar from one end = ..50... cm.

(b) Least count of stopwatch = ..0.01... s/div.

SN	Side A							Side B						
	Time Period for 10 Oscillations			Time Period (T)	l	l^2	lT^2	Time Period for 10 Oscillations			Time Period (T)	l	l^2	lT^2
	1	2	Mean					1	2	Mean				
1.	16.53	16.03	16.28	1.628	45	2025	119.26	15.91	16.00	15.95	1.595	45	2025	114.48
2.	15.44	15.87	15.65	1.565	40	1600	97.96	15.62	15.72	15.67	1.567	40	1600	98.2
3.	15.40	15.53	15.465	1.546	35	1225	83.65	15.37	15.44	15.40	1.540	35	1225	83.006
4.	15.35	15.18	15.21	1.521	30	900	69.40	15.30	15.41	15.35	1.535	30	900	70.68
5.	15.28	15.31	15.29	1.529	25	625	58.44	15.40	15.47	15.43	1543	25	625	59.62
6.	15.56	15.75	15.65	1.565	20	400	48.98	15.81	15.75	15.78	1.578	20	400	49.80
7.	16.81	17.00	16.91	1.691	15	225	42.89	16.94	17.01	17.02	1.702	15	225	43.45
8.	20.00	19.47	19.74	1.974	10	100	38.96	19.62	19.50	19.56	1.956	10	100	38.25
9.	27.19	27.03	27.11	2.711	5	25	36.74	26.16	26.87	26.51	2.651	5	25	35.13

Table 2: Measurement of l and T using second pendulum.

Position of CG of the bar pendulum from one end = ...

SN	Side A							Side B							
	Time Period for 10 Oscillations			Time Period (T)	l	l^2	l/T^2	Time Period for 10 Oscillations			Time Period (T)	l	l^2	l/T^2
	1	2	Mean					1	2	Mean				
1.														
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														

■ **DATA ANALYSIS:**

(a) from the plot of $T \sim l$

i. Determination of g using the data of first pendulum

SN	Straight Line Drawn	(i)	(ii)	Mean (L)	T	T^2	$\frac{L}{T^2}$	$g = \frac{4\pi^2 L}{T^2}$	Mean
1.	ABCD	AC= 62.5	BD= 63	62.75	1.6	2.56	24.511	967.65	
2.	A'B'C'D'	A'C'= 61.5	B'D'= 60.5	61	1.56	2.43	25.06	989.5	979.76
3.	A''B''C''D''	A''C''= 60	B''D''= 58	59	1.54	2.37	24.87	982.13	
4.									
5									

ii. Determination of g using the data of second pendulum

SN	Straight Line Drawn	(i)	(ii)	Mean (L)	T	T^2	$\frac{L}{T^2}$	$g=\frac{4\pi^2 L}{T^2}$	Mean
1.									
2.									
3.									
4.									
5									

iii. Determination of k using data of both pendulum.

SN	l_1	l_2	$K=\sqrt{l_1 l_2}$	Mean k
1.	AO= 43.5	OC= 19	28.74	
2.	OD= 45	OB= 18	28.46	
3.	A'O'= 40	O'C'= 21.5	29.32	
4.	O'D'= 40.5	O'B'= 20	28.46	28.821
5.	A''O'' = 35	O''C'' = 25	29.58	
6	O''D'' = 35	O''B'' = 23	28.37	
7				
8				
9				
10				

(b) Determination from the plot of $lT^2 \sim l^2$

SN	OA	OD	Slop (OA/OD)	$g=\frac{4\pi^2}{slop}$	$k=\sqrt{OD}$
1.					
2.					
3.					

Theoretical calculation of g in Kathmandu Valley $g = 9.8\left(1-\frac{2h}{r_E}\right)$ = ...

Where h is the height of Kathmandu Valley from Sea Level = 1350 m

The best value of $k = k \pm \sigma_k = \ldots \ldots$

- **RESULTS:**

(i) The best value of g = ... ± .....

(ii) Percentage error in g = ...

(iii) The best value of k = ... ± .....

(iv) Percentage error in k = ...

- **DISCUSSION**

In the lab, we took a bar pendulum and oscillated it in simple harmonic motion and recorded the time period of 10 oscillations with various length of pendulum along one side of the C.G. Then we took another side and did the same process and recorded time period of oscillation.

- **CONCLUSION:**

Thus, with the help of data from the graph of time vs length of pendulum, we were able to determine the acceleration due to gravity and radius of gyration of the bar pendulum.

- **PRECAUTIONS:**

(i) The knife edge should be placed correctly.

(ii) The angle of oscillation must be small.

(iii) The motion of pendulum should be simple harmonic.

- **ANSWER THE FOLLOWING QUESTIONS:**

A: Before Performing Experiment

(1) What is SHM ?