Experiment 11

Aim: To study the relationship between force of limiting friction and normal reaction and to find the coefficient of friction between a block and a horizontal surface.

Apparatus:

Formula:

Observation Table: Weight of block, W = 60 g wt

Weight of pan, P = 50 g wt

S.No.	Weights on block w (g wt)	Total weight pulled, R = W+w (g wt)	Weight on pan p (g wt)	Total weight, F = P+p (g wt)
1	0	60	0	50
2	50	110	20	70
3	100	160	50	100
4	150	210	80	130

Calculation: μ = F/R = 70/110 = 0.62

Graph:

Result:

Experiment 12

Aim: To find the weight of a given body using parallelogram law of vectors.

Apparatus:

Formula:

Diagram:

Observation:

S. No	Forces		Sides			Resultant Force R (g wt)	Unknown weight S (g wt)	Weight by spring balance (g wt)	Error
	P (g wt)	Q (g wt)	OA (cm)	OB (cm)	OC (cm)				
1	150	150	3	3	3.9	195	195	200	5
2	200	200	4	4	5.1	254	254	260	6
3	250	250	5	5	5.7	310	310	316	6

Result: Hence the parallelogram law has been verified.

Experiment 13

Aim: To study variation in volume with pressure for a sample of an air at constant temperature by plotting graphs between P and V and between P and 1/V.

Apparatus:

Formula:

Observations: Atmospheric pressure, P = 75 cm of Hg.

Position of Hg level		Pressure Difference	Pressure of Air	Volume of air V	1/V	PV
In Tube A (cm)	In Tube B (cm)	p (cm)	$P = P_0 + p$ (cm of Hg)	cm^3	cm^{-3}	
20	20	0	75	20	0.05	1500
19.5	15.6	3.9	78.9	19	0.053	1499.1
19	10.7	8.3	83.3	18	0.056	1499.4
18.5	5.3	13.2	88.2	17	0.059	1499.4
20.5	24.1	-3.6	71.4	21	0.048	1499.4
21	27.8	-6.8	68.2	22	0.045	1500.4

Experiment 14

Aim: To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.

Apparatus:

Formula:

Diagram:

Observations:

a) LC of vertical scale = 1 mm
b) LC of stop clock = 0.1 s
c) LC of screw gauge = 0.01 mm
d) Diameter of sphere, D = 2.58 cm
e) Distance fallen, s = 18 cm
f) Time taken, t = 1.3 s

Calculations:

a) Terminal velocity, v = s/t = 18/1.3 = 13.84 cm/s

b) Viscosity, $n = 2r^2(\rho - \sigma)g/9v = 2(1.29)^2(32\text{-}1)980/(9x13.84) = 811.74$ dyne.s/cm^2

Experiment 15

Aim: To study the relationship between the temperature of a hot body and time by plotting a cooling curve.

Apparatus:

Observation: Temperature of water in enclosure, T_0 = 30ºC

S.No.	Time for Cooling t (min)	Temperature of water in calorimeter T (ºC)	Difference $T\text{-}T_0$ (ºC)
1	0	70	40
2	1	68	38
3	2	66	36
4	3	64	34
5	4	62	32
6	5	61	31
7	6	60	30
8	7	59	29
9	8	58	28

Graph & Result:

Activity 01

Aim: To determine the mass of a given body using a metre scale by principle of moments.

Apparatus:

Formula:

Diagram:

Observation:

S.No.	Length of weight arm a (cm)	Mass of weight in the paper pan M (g)	Unknown mass m(g)
1	30	20	20
2	35	20	20
3	40	20	20

Result: The unknown mass is 20 g.

Activity 02

Aim: To plot a graph for a given set of data, with proper choice of scales and error bars.

Apparatus:

Data:

Load (gf)	50	100	150	200	250	300
Extension (cm)	0.1	0.2	0.3	0.4	0.5	0.6

Graph:

Result: The graph has been plotted successfully.

Activity 03

Aim: To study the variation in range of a jet of water with angle of projection.

Apparatus:

Formula:

Observations:

S.No.	**Angle of projection of water jet θ**	**Range of water jet R (m)**
1	15^o	0.1
2	30^o	0.25
3	45^o	0.3
4	60^o	0.25
5	75^o	0.15

Graph:

Result: Range is maximum at an angle of projection of 45^o

Activity 04

Aim: To observe change of state and plot a cooling curve for molten wax.

Apparatus:

Observation:

S.No.	Time for cooling t (min)	Temperature of wax T (ºC)
1	0	80
2	1	76
3	2	72
4	3	69
5	4	66
6	5	63
7	6	61

Graph:

Result: The temperature falls quickly in the beginning and then slowly.

Activity 05

Aim: To study the factors affecting the rate of loss of heat of a liquid.

Apparatus:

Diagram:

Observation:

1) Calorimeter A having small surface area:

S.No.	Time for Cooling t (min)	Temperature of water in calorimeter T (ºC)
1	0	70
2	1	68
3	2	66
4	3	64
5	4	62

2) Calorimeter B having large surface area:

S.No.	Time for Cooling t (min)	Temperature of water in calorimeter T (^oC)
1	0	70
2	1	64
3	2	58
4	3	52
5	4	46

Graph:

Note: Graph of both tables must be plotted together on same graph and label the graphs as A and B.