

King Abdul Aziz University
Faculty of Science
Physics Department
Year: 1433/ 1434
Term: 1

Course: 281
Report number (3)
(Free Fall)

Name of Experiment:
Free Fall

Student's Name:

Student's Number:

Lab partners' name:

Instructor's Name:
Najah Altwarqi

Objective:

1- to find the acceleration of gravity .

Apparatuses:

- 1- Smart Timer .
- 2- Meter .
- 3- Ball .
- 4- Drop Box .
- 5- Time Of Light Accessory .

Equations:

$$T^2 = \frac{2}{g} \times h (s^2)$$

$$g = \frac{2}{\text{slope}} (m/s^2)$$

T^2 → The time consumed while
the ball is falling

h → The distance which crossed
by the ball from start point to
end point

Data:

♣ Zero Error = 1

$h \text{ (m)} \times 10^{-2}$	$T_1 \text{ (s)}$	$T_2 \text{ (s)}$	$T_{avg} = \frac{T_1 + T_2}{2} \text{ (s)}$	$T^2 \text{ (s)}$
73 - 1=72	0.4059	0.4011	0.4035	0.1628
64 - 1=63	0.3816	0.3831	0.38235	0.1461
51 - 1=50	0.3274	0.3269	0.32715	0.1070
44.5 - 1=43.5	0.3059	0.3025	0.3042	0.0925
33 - 1=32	0.2635	0.2624	0.26295	0.0691

Graph:

♣ The Graph :

(you can see it in the next page)

Calculations and results:

$$\clubsuit \text{Zero Error} = 1$$

$$h = h - 1$$

(See The Table *column 1*)

$$\clubsuit \text{Slope} = \frac{\Delta y}{\Delta x \times 10^{-2}} = \frac{0.093 - 0.069}{(43.5 - 32) \times 10^{-2}} = 0.209 \text{ s}^2/\text{m}$$

$$\clubsuit g = \frac{2}{\text{slope}} = \frac{2}{0.209} = 9.57 \text{ m/s}^2$$

$$\clubsuit \text{Error} = \frac{9.8 - 9.57}{9.8} \times 100 = 2.35\%$$

$$\clubsuit T^2 = (T_{\text{avg}})$$

(See The Table *column 5*)