Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) any sensible suggestion eg

- theory supported by results from other experiments
- could not believe the 'theory' could be wrong
- 'theory' is the basis of many other ideas

1

(b) any **two** from:

- to allow peer review of data
- to assess the reproducibility of the data
- to promote further enquiry / experiments
- to encourage other scientists to develop explanations / new theories

2

(c) 730 000 = 300 007 400 × time

1

time = $\frac{730\,000}{300\,007\,400}$

*this step without the previous step stated gains **2** marks*

1

2.43(3273) × 10^{-3} s

accept 0.00243(3273) s

1

*allow 2.43(3273) × 10^{-3} with no working for **4** marks*

(d) 60 × 10^{-9} s

1

(e) systematic error

1

(f) add on 60 nanoseconds to each time recorded (then recalculate)

1

[9]

Q2.

(a) air molecules colliding with a surface create pressure

1

at increasing altitude distance between molecules increases

or

at increasing altitude fewer molecules (above a surface)

1

so number of collisions with a surface decreases

or

or so always less weight of air than below (the surface)

1

(b) atmospheric pressure = 20 kPa from graph **and** conversion of 810 cm^2 to 0.081 m^2

allow ecf for an incorrect value clearly obtained from the graph

1

$5 \times 10^4 = \frac{F}{0.081}$

1

$F = 5 \times 10^4 \times 0.081$

1

4050

1

4100 (N)

1

*allow 4100 (N) with no working shown for **5** marks*
*allow 4050 with no working shown for **4** marks*

(c) force from air pressure acting from inside to outside bigger than force acting inwards

1

so keeps the window in position

1

[10]