AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



MARK SCHEME

4.5.5.2 ATMOSPHERIC PRESSURE

SCORE	PERCENTAGE
/42	%

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Mark schemes

Q1.

(a) C

1

(b) weight = 2.5 × 9.8

1

weight = 24.5 (N)

*an answer of 24.5 rounded to 25 scores **2** marks*

1

*an answer of 24.5 scores **2** marks*

(c) the upthrust is the same as the weight

1

(d) (resultant) force = mass × acceleration

allow F = m a

1

(e) 4.0 = 2.5 × a

1

$$a = \frac{4.0}{2.5}$$

1

a = 1.6 (m/s^2)

1

*an answer of 1.6 scores **3** marks*

[8]

Q2.

(a) $$p = \frac{27}{0.009}$$

1

p = 3000

1

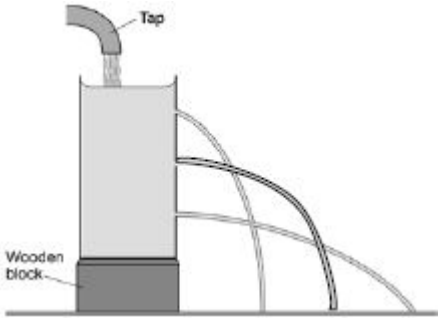
Pa

1

*an answer of 3000 scores **2** marks*

(b)

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the water path hits the surface somewhere between the other two paths

1

(c) pressure increases with depth

allow when the pressure is higher, the water travels further

1

(d) pressure acts in all directions
or
pressure causes a force on (all) the surfaces

ignore liquids cannot be compressed

1

[6]

Q3.

(a) all heights drawn the same as tube 1

judge by eye

1

(b) increasing depth increases the height / mass / volume (of the water column) above the swimmer

allow more water above (the swimmer)
more water is insufficient

1

increasing the weight / force (of water) acting on the swimmer

1

(c) increase in depth = 1.2 (m)

1

(Δ) p = 1.2 × 1030 × 9.8

allow either 0.50 ***or*** *1.70 for 1.2*

1

(Δ) p = 12112.8

allow a correctly rounded answer
allow a correct calculation using either 0.50 ***or*** *1.70*

1

pascals **or** Pa

do ***not*** *accept pa*
allow N/m^2

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1

*an answer of 12 112.8 scores **3** marks*

[7]

Q4.

(a) arrow of equal size pointing vertically upwards

judged by eye
ignore horizontal arrows if equal and opposite
horizontal arrows of unequal length negates this mark

1

labelled ‘upthrust’

ignore buoyancy
ignore 25 kN

1

(b) weight = 25 kN

allow 24 to 25 kN inclusive

1

25 000 = mass × 9.8
or
$m = \frac{25000}{9.8}$

allow their W correctly converted and substituted

1

m = 2551 kg

allow correctly calculated value using their converted W
allow a value correctly calculated with W in kN

1

m = 2600 kg

allow a calculated answer correctly rounded to 2 significant figures

1

*an answer of 2600 scores **4** marks*

(c) Newton’s 3rd law (of motion)

1

(d) vertical force (50 N) drawn
and
horizontal force (150 N) drawn to the same scale

1

resultant tension force in the correct direction

shown by an arrowhead

1

value of the tension force in the range 156 N−160 N

allow a calculated value of 158

1

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value of direction in the range 18°−20° (from the horizontal)

allow 70° to 72° (from the vertical)
allow a bearing in the range 288 to 290

1

[11]

Q5.

(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]

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