AQA GCSE Physics

Practice answers

	Answers	Extra information	Mark	AO / Specification reference
01.1	pressure = $\frac{\text{force}}{\text{area}}$	accept P = $\frac{F}{A}$	1	AO1 4.5.5.1.1
01.2	pressure = $\frac{2000}{0.02}$ = 100 000 Pa or N/m^2		1 1 1	AO1 AO2 4.5.5.1.1
01.3	at right angles/perpendicular to the wall		1	AO1 4.5.5.1.1
01.4	the direction of the force is the same		1	AO2 4.5.5.1.1
02.1	the force of the Earth/weight/gravity the force of the water/upthrust	do not accept 'acceleration due to gravity' or 'g'	1 1	AO1 AO2 4.5.5.1.2
02.2	the upthrust balances/is equal to the weight	accept 'no resultant force' do not accept 'no forces acting'	1 1	AO2 4.5.5.1.2
02.3	**any** three from: • (as the child adds sand) the boat floats deeper in the water/more of the boat is submerged in the water • the pressure exerted by the water on the boat increases with depth (so) the upthrust increases (as the area is the same, force ∝ pressure) • the boat still floats because the larger weight is balanced by the larger upthrust	or words to that effect one point per correct answer up to a maximum of three points	3	AO1 AO2 4.5.5.1.2

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03.1	X, Y, W	one mark for X before Y one mark for Y before W	2	AO3 4.5.5.1.2
03.2	the weight of Y is greater Y moves/floats further into the liquid before the pressure is big enough for the upthrust to balance the weight		1 1 1	AO3 4.5.5.1.2
03.3	pressure = $\frac{\text{force}}{\text{area}}$	accept P = $\frac{F}{A}$	1	AO1
03.4	surface area = 0.01 x 0.01 = 1×10^{-4} m^2 pressure = $\frac{0.015}{1 \times 10^{-4}}$ = 150 N/m^2 **or** Pa		1 1 1	AO1 AO2
04.1	centre of mass	accept centre of gravity	1	AO2 4.5.1.3
04.2	appropriate diagram with scale given clear identification of vertical component 2.6 N	allow 2.2 – 3.0 N	1 1 1	AO2 4.5.1.4
04.3	2.6 N	allow answers using range 2.2 – 3.0 N from last question	1	AO2 4.5.1.4
04.4	appropriate diagram with scale given clear identification of resultant of two forces using a parallelogram 3.1 N	allow 2.7 – 3.5 N	1 1 1	AO2 4.5.1.4

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05.1	independent – volume of water in the bottle dependent – distance travelled by jet	accept 'height of water column'	1 1	AO2 4.5.5.1.2
05.2	a graph that shows increasing volume produces increasing distance as the volume/height decreases, the pressure exerted by the column decreases so the force on the water is less so the jet travels a smaller distance	allow reverse argument	1 1 1 1	AO2 4.5.5.1.2
05.3	the ruler does not start in the right place move the ruler so that zero is next to the edge of the bottle where the hole is.		1 1	AO3
06.1	pressure increase = depth × density × gravitational field strength $= 10 \times 1 \times 10^3 \times 9.8.$ = 98 000 Pa $= \frac{98000}{1000}$ kPa = 98 kPa (approx. 100 kPa)	accept P = h x ρ x g must explicitly convert to kPa	 1 1 1	AO2 4.5.5.1.2
06.2	water pressure = 405 kPa - 101 kPa = 304 kPa using diver's rule, $\frac{304}{100} = 3.040$ 3.04 x 10 = 30.4 m		1 1 1	AO2 4.5.5
07.1	downwards force – interaction of the ball with the Earth upwards force – interaction of the ball with the ground		1 1	AO2 4.5.1.2
07.2	work = force × distance	allow W = F x d	1	AO1 4.5.2

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07.3	19 = friction × 4.6 friction = $\frac{19}{4.6}$ = 4.13 = 4.1 N (to two significant figures)	 answer to two significant figures	1 1 1 1	AO2 4.5.2
07.4	on ball, arrow downwards labelled weight arrow horizontally to left labelled air resistance		1 1	AO2 4.5.1.2 4.5.1.4
07.5	the force of the ground on the ball/reaction force		1	AO2 4.5.1.2 4.5.1.4
08.1	air molecules collide with a surface and produce a force pressure = $\frac{\text{force}}{\text{surface area}}$		1 1 1	AO1 AO2 4.5.5.2
08.2	the atmospheric pressure increases		1	AO1 4.5.5.2
08.3	no there are more air molecules (and more weight) above (the phone) so the pressure is greater		1 1 1	AO1 AO2 4.5.5.2

	Answers	Extra information	Mark	AO / Specification reference
09	sketch graph showing smooth curve decreasing pressure with height approximately halving every 5 km labelled axes at higher altitudes there is less weight of air above that point and so less pressure is exerted.		1 1 1 1	AO1 AO2
10.1	weight = mass × gravitational field strength	accept W = mg	1	AO1 4.5.1.3
10.2	80 × 9.8 = 784 N		1 1	AO2 4.5.1.3
10.3	force on each spring = $\frac{784}{4}$ = 196 N		1 1	AO2 4.5.3
10.4	force = spring constant × extension 3.4 cm = 0.034 m 196 = spring constant × 0.034 spring constant = $\frac{196}{0.034}$ = 5765 N/kg		1 1 1 1	AO1 AO2 4.5.3
10.5	the same the spring has not deformed elastically		1 1	AO2 4.5.3
11.1	pressure = height × density × gravitational field strength = $1 \times 10^3 \times 9.8$ = 9800 Pa	accept P = h x ρ x g	1 1	AO2 4.5.5.1.2

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11.2	the pressure gauge reads the pressure due to the column of water **and** the column of air above it)atmospheic pressure)		1 1	AO2 AO2 4.5.5.1.2
11.3	pressure is proportional to density if the salt content is higher, the density is higher if the density is higher, the pressure will be higher		1 1 1	AO3 4.5.5.1.2
12.1	**any** three from: • (if the bag is sealed at the bottom of the mountain) the gas inside the bag will be at atmospheric pressure • as he goes up the mountain the atmospheric pressure decreases /will be less than the pressure of the gas inside the bag (so the volume increases) • pressure is inversely proportional to volume • (so) if the volume increases by a factor of three, the pressure has decreased by a factor of three	one mark for each correct answer up to a maximum of three marks	3	AO2 4.5.5.1.2
12.2	$\frac{100}{3}$ = 33 kPa		1 1	AO2
12.3	if the density decreases the pressure that you calculate at a given height is actually less than that predicted assuming density is constant		1	AO3 4.5.5.1.2