AQA GCSE Physics
Practice answers

	Answers	Extra information	Mark	AO / Specification reference
01.1	Sun moons moons/planets (in either order)/gravity centripetal		1 1 3 1	AO1 4.8.1.1 4.8.1.3
01.2	correct similarity and difference e.g., both objects are in orbit around different objects (planet around the Sun/Moon around a planet)	do not accept difference based on size	1 1	AO1 4.8.1.1 4.8.1.3
01.3	two correct similarities e.g., both objects are in orbit around a planet due to the force of gravity	do not accept difference based on size	1 1	AO1 4.8.1.1 4.8.1.3
01.4	(the) Milky Way		1	AO1 4.8.1.1
02.1	the galaxy is moving away from Earth so the light from the galaxy is shifted to the red/B longer wavelength end of the spectrum.		1 1	AO1 4.8.2
02.2	the further the black lines are (red) shifted/ move towards the red end of the spectrum, the faster the galaxy is moving		1	AO2 4.8.2
02.3	the lines are shifted by a smaller amount		1	AO2 4.8.2
02.4	the line would be shifted towards A/to the left/to the blue end of the spectrum		1	AO3 4.8.2

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03.1		a lower pitched sound has a longer wavelength		1	AO2
		red-shifted light has a longer wavelength		1	4.8.2
03.2		the redshift is due to the Universe expanding (when observing galaxies) or stars moving away from us		1	AO1
					AO2
		the difference in the redshift is due to the speeds of the galaxies and stars as they move away from us		1	4.8.2
03.3		the force of gravity is pulling everything in the universe together		1	AO2
					4.8.2
03.4		there is dark energy		1	AO1
		they do not know what dark energy is or how it works		1	AO2
					4.8.2
04.1		up and down		1	AO1
		the direction of the oscillations of the wave is at right angles/perpendicular to the direction of motion of the wave		1	4.6.1.1
04.2		six waves		1	AO1
		$\dfrac{12}{6}$ = 2 cm/0.02 m		1	AO2
					4.6.1.2
04.3		frequency (of the moving bar)		1	AO1
					4.6.1.2
04.4		count the number of times the bar moves up and down per second	one mark for indication of frequency	1	AO2
		measure the time for a (large) number of movements up and down (divide the number of movements by the time)	one mark for indication of measuring a number of oscillations of the bar	1	4.6.1.2
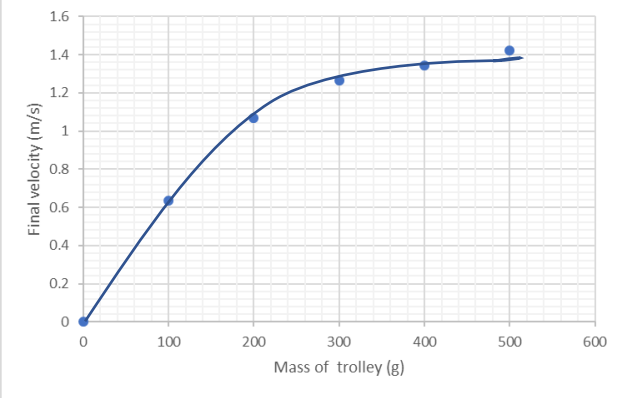
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05.1		bigger than nebula supernova		1 1 1	AO1 4.8.1.2
05.2		(nuclear) fusion		1	AO1 4.8.1.1
05.3		supernovae explode scattering elements throughout the universe gravity pulls them together to make stars and planets		1 1	AO2 4.8.1.1 4.8.1.2 4.8.1.3
06.1		the force is at right angles/perpendicular to the direction of motion at all times/ centripetal/towards the centre of the circle		1	AO1 4.8.1.3
06.2		one point for correctly plotting points one point for line of best fit		2	AO2 AO3 4.8.1.3
06.3		500 days	allow 450 - 550	1 1	AO2 AO1 4.8.1.3
06.3		the distance travelled by Planet e is approximately double that of Marjiriti the time taken for the orbit of Planet e is about 3 times that of Marjiriti speed = $\dfrac{\text{ditance}}{\text{time}}$, so speed of planet e is about $\dfrac{2}{3}$ that of Marjiti		1 1 1	AO3 4.8.1.3

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07.1	the universe began as a massive explosion from a very small, hot, dense region of space	one mark for 'explosion' one mark for mentioning one or two of 'small', 'hot' and 'dense' two marks for all three of 'small', 'hot' and 'dense'	3	AO1 4.8.2
07.2	an object moving away twice as fast as another object will double the distance between them in a given time interval showing that the universe is expanding		1	AO2 4.8.2
07.3	one mark for straight line graph labelled P one mark for curved line graph labelled I one mark for line labelled I above line labelled P		3	AO1 AO2 4.8.1.1 4.8.1.2 4.8.1.3 4.8.2
	the gradient = $\dfrac{speed}{distance}$		1	
	speed = $\dfrac{distance}{time}$		1	
	so units of gradient = $\dfrac{1}{time}$		1	
10	**Level 3**: Correctly describes the formation of a protostar, conditions for fusion and reasons for equilibrium. Well organised answer.		5-6	AO1 AO2 4.8.2
	Level 2: Describes the formation of a protostar, lacks some details about conditions for fusion or reasons for equilibrium. Some organisation of answer.		3-4	
	Level 1: Some description of formation but lacking details about fusion or equilibrium. Answer shows poor organisation.		1-2	
	No relevant content.		0	

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		Indicative content: • the Sun was formed from a cloud of dust and gas/nebula • that came together due to the force of gravity • to form a protostar • the gas/hydrogen eventually moves fast enough to start fusion reactions • producing energy/radiation that expands the gas that makes up the star			
	08.2	a small mass star (the same mass as the Sun) will become a red giant, white dwarf, and black dwarf a larger mass star than the Sun will become a red supergiant, supernova, and neutron star or black hole.		3 3	AO1 4.8.2
	09.1	there was not enough evidence to support her conclusion/the conclusion opposed what was thought at the time/people did not want to change what they thought		1	AO3 4.8.1.2
	09.2	more people had studied the evidence/more research had been done by other scientists/ published in journals/had time to get used to the idea changing		1	AO3 4.8.1.2
	09.3	four 2		1 1	AO2 4.8.1.2
	09.4	two helium nuclei fuse to produce Be/beryllium three helium nuclei fuse to produce C/carbon		1 1	AO2 4.8.1.2
	09.5	fusion involves the joining of nuclei which are positively charged so repel larger nuclei mean more charge, and a bigger repulsive force		1 1 1	AO2 4.8.1.2

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09.6	iron		1	AO2 4.8.1.2
10.1	the bung		1	AO2 4.8.1.3
10.2	the tension in the string	allow the weight of the masses do not allow 'masses'	1	AO2 4.8.1.3
10.3	any two correct sources e.g., • reaction time when using a stopwatch • parallax/not reading straight when using a ruler • not keeping the speed constant/circle horizontal	one mark for each correct answer up to a maximum of two marks	2	AO3 4.8.1.2
10.4	if the radius is smaller, the speed is larger		1	AO2 4.8.1.3
10.5	friction/air resistance		1	AO2 4.8.1.3
11.1	W, X, Z	one mark for one or two correct two marks for all correct	2	AO1 AO2 4.8.2
11.2	pull the elastic to make it longer it shows that as space expands, the wavelength of the radiation increases		1 1	AO3 4.8.2
11.3	to demonstrate phenomena that are difficult/too big/too small to see to make predictions/explanations of observations		1 1	AO2

		Answers	Extra information	Mark	AO / Specification reference
12.1		accelerating then moving with a steady speed/velocity downwards		1 1 1	AO2 4.5.6.1.4
12.2		stationary		1	AO2 4.5.6.1.4
12.3		draw a tangent to the curve at five seconds calculate the slope of the tangent. velocity = $\dfrac{-4.0-(-1.8)}{7.6-0}$ = -0.29 m/s either negative sign or explicit statement that the velocity is downwards		1 1 1	AO2 4.5.6.1.4 4.5.6.1.5
12.4		one mark for graph showing initial negative velocity, then horizontal line showing constant negative velocity one mark for section at zero velocity in the middle one mark for positive velocity, then horizontal line showing constant positive velocity one mark for curved line joining sections		4	AO3 4.5.6.1.4 4.5.6.1.5
13.1		the forces on it are unbalanced/there is a resultant force on it the upthrust/force of the water on the balloon is greater than the weight/force of gravity on the balloon		1 1	AO2 4.5.5.1.1 4.5.4.1.2
13.2		pressure = height of column × density of water × gravitational field strength = 3 × 1000 × 9.8 = 29 400 Pa		1 1 1	AO2 AO1 4.5.4.1.2

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13.3	reading will be higher because the correct reading is atmospheric pressure (about 101 kPa) plus pressure due to the water column		1 1	AO2 4.5.4.1.2 4.5.5.2
14.1	independent – mass of moving trolley dependent – velocity of combined trolleys		1 1	AO2 4.5.6.1.3
14.2	control variables – mass of stationary trolley/speed of moving trolley		2	AO3 4.5.6.1.3
14.3	the uncertainty is the range of repeat measurements divided by two range is between 0.3 and 0.01 so the largest uncertainty = $\frac{0.3}{2}$ = 0.15		1 1	AO1 AO2 4.5.6.1.3
14.4	 yes, it should go through (0,0) if the mass of the trolley is zero, it will have no momentum, so the momentum/velocity after the collision will be zero	one mark for correctly plotting points one mark for line of best fit	2 1 1	AO2 AO3 4.5.6.1.3

	Answers	Extra information	Mark	AO / Specification reference
14.5	initial momentum = final momentum initial momentum = 0.1 × 2.0 = 0.2 kg m/s final momentum = (0.1 + 0.2) × final combined velocity 0.2 = 0.3 × final combined velocity final combined velocity = $\frac{0.2}{0.3}$ = 0.67 m/s percentage difference = $\frac{0.67 - 0.63}{0.67}$ x 100 = 6.0%	one mark for giving answer to two significant figures	1 1 1 1 1 1	AO1 AO2 4.5.7.2