AQA

GCSE
PHYSICS

PAPER 2F

Mark scheme

Specimen 2018

Version 0.1

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	K		1	AO1/1 4.3.1.2
01.2	speed = 3 × 0.12 speed = 0.36	allow 0.36 with no working shown for the **2** calculation marks	1 1	AO2/1 4.3.1.2
01.3	decreases		1	AO1/1 4.3.1.2
01.4	the wave moves across the pond and not the water.		1	AO2/1 4.3.1.1 WS3.6
Total			**5**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2.1	Earth is at the centre (not the Sun)	accept there are fewer planets	1	AO1/1 4.8.1.1/3
2.2	Shows the moon in orbit around the Earth	accept the planets have circular orbits	1	AO1/1 4.8.1.1/3
2.3	circular (orbits) around the Earth		1 1	AO1/1 4.8.1.3
2.4	gravity		1	AO1/1 4.8.1.3
Total			**5**	
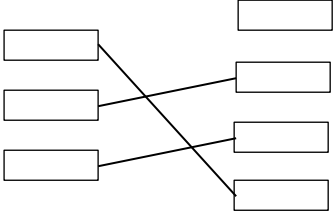
Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	both directions correct (along direction of line of force)		1	AO1/1 4.5.1.2
03.2	induced		1	AO1/1 4.5.1.1
03.3	top of nail labelled N/north bottom of nail labelled S/south	both required	1	AO2/1 4.5.1.1
03.4	bar 2 only two magnets can repel so cannot be bar 1 or bar 3 **or** (the same end) of bar 1 attracts both ends of bar 2		1 1	AO2/1 4.5.1.1
03.5	control		1	AO3/1a 4.5.1 WS2.2
03.6	fridge magnet is a categoric variable	accept fridge magnet is not a continuous variable	1	AO2/2 4.5.1 WS2.2
03.7	bar drawn up to 4 on the y-axis	ignore the width of the bar	1	AO2/2 4.5.1 WS3.1
03.8	because the magnet with the biggest area was not the strongest	accept any correct reason that confirms the hypothesis is wrong	1	AO3/1b 4.5.1 WS3.6
Total			**9**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	800 – 800		1	AO2/1 4.1.1.2
04.2	it will have a constant speed		1	AO1/1 4.1.6.2.1
04.3	F = 1200 × 4 F = 4800	allow 4800 with no working shown for the **2** calculation marks	1 1	AO2/1 4.1.6.2.2
04.4	14		1	AO2/1 4.1.6.3.1
04.5	70		1	AO2/1 4.1.6.3.1
04.6	The driver being very tired		1	AO1/1 4.1.6.3.2
04.7	measure the distance the ruler falls before stopping the greater this distance the greater the reaction time repeat with different students stopping the ruler	accept greater this distance the slower the reactions do **not** accept slower reaction time	1 1 1	AO2/2 4.1.6.3.2
04.8	reaction time decreases with practice		1	AO3/2a 4.1.6.3.2
04.9	the stop clock was started before the computer test started the student was distracted		1 1	AO3/3a 4.1.6.3.2
Total			**13**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	From K to L		1	AO1/2 4.1.3
05.2	ruler is not vertical	accept ruler is not upright	1	AO3/3a 4.1.3 WS3.7
05.3	the same as smaller than	correct order only	1 1	AO3/3a 4.1.3 WS3.7
05.4	the spring is longer spring has gone past the limit of proportionality	accept elastic limit for limit of proportionality accept spring is permanently stretched	1 1	AO3/2a AO2/2 4.1.3 WS3.5
05.5	The extension is directly proportional to the weight.		1	AO3/2b 4.1.3
05.6	C		1	AO3/2b 4.1.3
TOTAL			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	D		1	AO1/1 4.1.1.2
06.2	C		1	AO1/1 4.1.1.2
06.3	W = 300 × 45		1	AO2/1
	W = 13 500		1	AO2/1
		allow 13 500 with no working shown for the **2** calculation marks		
	joules / J	do **not** accept j	1	AO1/1 4.1.2
06.4	it is much faster		1	AO2/1 4.1.6.1.2
06.5	straight line drawn from 13 m/s to 0 m/s		1	AO2/2 4.1.6.1.5
	finishing on x-axis at 65 s		1	
06.6	value of 13 taken from graph and used correctly		1	AO2/1 4.1.6.1.5
	130 (m)	allow **1** mark for attempted correct use of graph allow 130 with no working shown for **2** marks	1	
Total			**10**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	Third Law		1	AO1/1 4.1.6.2.3
07.2	elastic potential		1	AO1/1 4.1.3
07.3	weight = mass × gravitational field strength	accept gravity for gravitational field strength accept W = mg	1	AO1/1
	350 = m x 10		1	AO2/1
	m = 35	allow 35 with no working shown for the **2** calculation marks	1	AO2/1 4.1.1.3
07.4	force = spring constant × compression	accept force = spring constant × extension accept F = k e	1	AO1/1
	350 = k × 0.07 **or** k = 350 ÷ 0.07		1	AO2/1
	k = 5000	allow 5000 with no working shown for the **2** calculation marks	1	AO2/1 4.1.3
Total			**8**	
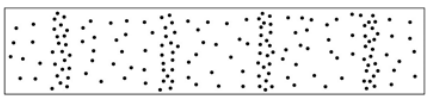
Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1		award **1** mark for each correct line if more than one line is drawn from any em wave then none of those lines gain credit	3	AO1/1 4.3.2.4
08.2	ionising		1	AO1/1 4.3.2.3
08.3	chest X-ray gives a risk of 1 in 200 000 u.d.s. X-ray gives a risk of 1 in 4000 risk from u.d.s. X-ray is 50 times greater than risk from chest X-ray	allow **1** mark for risk from u.d.s. X-ray is greater than a chest X-ray if no other marks awarded	1 1 1	AO2/2 4.3.2.3 WS1.5
Total			**7**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	centre gear wheel anticlockwise **and** largest gear wheel clockwise	both required	1	AO2/1 4.1.4
09.2	moment = 280 × 1.5 moment = 420	allow 420 with no working shown for the **2** calculation marks	1 1	AO2/1 4.1.4
09.3	the clockwise moment decreases it is now less than the anticlockwise moment so child A moves downwards **or** so child B moves upwards		1 1 1	AO2/2 4.1.4
Total			**6**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	red shift		1	AO1/1 4.8.2
10.2	the further away from the Earth, the faster a galaxy is moving		1	AO3/1a 4.8.2 WS3.5
10.3	B is above and to the right of A		1	AO2/1 4.8.2
10.4	**strength** as the balloon expands the dots get further apart, representing the galaxies moving apart **weakness** dots are only on the surface of the balloon, galaxies are throughout the universe **or** there is a limit to how far the balloon can expand		1 1	AO3/1b 4.8.2 WS1.2
10.5	Big-Bang		1	AO1/1 4.8.2
10.6	both theories suggest that the Universe is expanding		1	AO1/2 4.8.2
10.7	new evidence / observations that cannot be explained by Theory 1	accept specific example of new evidence ie CMBR	1	AO1/1 4.8.2 WS1.1
Total			**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
11.1	$\text{magnification} = \dfrac{\text{image height}}{\text{object height}}$		1	AO3/1b 4.3.2.5
	dividing by an object height of 1cm gives the same (numerical) value		1	
11.2	image is half the height of the object		1	AO2/1 4.3.2.5
11.3	accept anything practical that would work eg: use a taller object use a (travelling) microscope attach a scale to the screen and used a magnifying glass		1	AO3/3b 4.3.2.5 WS2.3/7
11.4	both points plotted correctly correct line of best fit drawn	a curve passing through all points (within ½ square), judge by eye	1 1	AO2/2 4.3.2.5 WS3.1/2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
11.5	the greater the distance the smaller the magnification		1	AO3/2b
				4.3.2.5
	further relevant amplification eg:		1	WS3.5
	magnification increases steeply as distance decreases below 30cm			
	or			
	distances greater than 40cm the image is smaller than the object			
11.6	by dividing the distance between the lens and the image by the distance between the lens and the object		1	AO3/1a
	at least one correct calculation and comparison eg 100÷25 = 4 which is the same as the measured magnification		1	AO2/2
				4.3.2.5
				WS3.5
Total			**10**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
12.1			1	AO1/1 4.3.1.1
12.2	330		1	AO1/1 4.1.6.1.2
12.3	they are parallel	accept the same direction	1	AO1/1 4.3.1.1
Total			**3**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
13.1	refracted		1	AO1/1 4.3.2.2
13.2	(place the glass block on a piece of paper,) draw around the block and then remove from the paper		1	AO1/2 4.3.2.2
	mark a normal line (at 90° to the surface of the block). Use a protractor to measure and then draw a line at an angle of 20° to the normal		1	
	replace the glass block and point the ray of light down the drawn line		1	
	mark the ray of light emerging from the block		1	
	remove the block and draw in the refracted ray		1	
	repeat the procedure for each of the other angles *l*		1	
13.3	difficult to judge where the centre of the ray is		1	AO1/2 4.3.2.2
Total			**8**	