Rewarding Learning

General Certificate of Secondary Education
2015

GCSE: Physics

Unit 2

Foundation Tier

[GPH21]

FRIDAY 19 JUNE, MORNING

MARK SCHEME

General Marking Instructions and Mark Grids

Introduction

Mark schemes are intended to ensure that the GCSE examination is marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria that they should apply in allocating marks to candidates' responses. The mark schemes should be read in conjunction with these marking instructions.

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality response reflecting the level of maturity which may reasonably be expected of a 16-year-old which is the age at which the majority of candidates sit their GCSE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, the examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners must be positive in their marking, giving appropriate credit for description, explanation and analysis, using knowledge and understanding and for the appropriate use of evidence and reasoned argument to express and evaluate personal responses, informed insights and differing viewpoints. Examiners should make use of the whole of the available mark range of any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 16-year-old GCSE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Types of mark scheme

Mark schemes for questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

							AVAILABLE MARKS
1	(a)	(i)	By a sound (wave)			[1]	
		(ii)	Vibrate		[1]		
			parallel to wave direction		[1]	[2]	
		(iii)	It (ball) moves up and down			[1]	
		(iv)	$\frac{10}{20} = 0.5$		[1]		
			Hz		[1]	[2]	
		(v)	$V = f\lambda = 0.5 \times 1.2$ ecf for frequency from **(iv)**		[1]		
			$= 0.6$		[1]	[2]	
		(vi)	Refraction			[1]	
		(vii)	They slow down – no credit for change direction		[1]		
			As they enter **shallow** water		[1]	[2]	
	(b)	Longer:	Infrared	Microwaves	Radio	[1]	
		Use:	Heating/ Remote	Communications	Communication	[1]	
		Shorter:	Ultraviolet	X-ray	Gamma	[1]	
		Use:	Sunbeds/ Forgeries	Diagnose broken bones	Cancer treatment	[1]	[4]
			The name of the wave to reflect the wavelength. Must get name correct to access use mark The use of the wave to reflect the name of the wave				
	(c)	(i)	Best fit line			[1]	
		(ii)	No – line does not pass through 0,0 **or** origin **or** doubling the temperature does not double speed			[1]	
		(iii)	342.8 ± 0.4 (m/s)			[1]	
		(iv)	$V = 330 + 0.7 \times 25$		[1]		
			$= 347.5$		[1]	[2]	20
2	(a)	(i)	The normal, angles of incidence and reflection marked			[3]	
		(ii)	30°			[1]	
		(iii)	Ray from head to eye		[1]		
			So that i = r (judge by eye)		[1]		
			Arrows on both rays		[1]	[3]	
		(iv)	Ray from chin to eye		[1]		
			So that i = r (judge by eye)		[1]	[2]	
		(v)	5 + 6				
			11 (cm)			[2]	

AVAILABLE MARKS

(b) **(i)** Move lens until image of tree on screen, adjust until it is sharp [2]

(ii) Distance from lens to screen [1]

(iii) Repeat take average/or use more distant object, e.g. the Sun [1]

15

3 **(a)** **(i)** No [1]
The circuit is incomplete [1] [2]

(ii) I = V/R = 12/10 [1]
=1.2 (A) [1] [2]

(b)

Switch S_1	Switch S_2	Fan	Heater	Hairdryer	
Open	Open	Off	Off	Off	[1]
Open	Closed	Off	Off	Off	[1]
Closed	Open	On	Off	Cold	[1]
Closed	Closed	On	On	Warm	[1] [4]

Mark by row

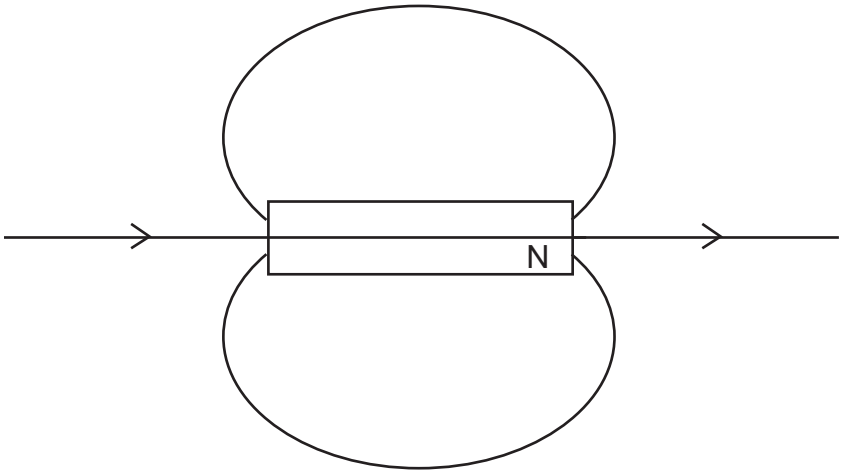
(c) **(i)** Lamp in series with ammeter and variable PSU
(or battery with rheostat) [1]
Voltmeter in parallel with lamp [1]
Symbols correct for ammeter, voltmeter, lamp [1]
Complete circuit [1] [4]

(ii) Indicative Content:
1. Switch on PSU/battery/close switch **or** indicate circuit is on
2. Record current } find or measure **or** { reading on ammeter
3. Record voltage } { reading on voltmeter
4. In a table or plot graph
5. Adjust rheostat or PSU voltage
6. Take range of current and voltage measurements

Response	Mark
Candidates describe in detail using good spelling, punctuation and grammar any **five** of the points in the Indicative Content. The form and style are of a high standard and specialist terms are used appropriately at all times.	[5]–[6]
Candidates describe in detail using good spelling, punctuation and grammar **at least three** of the points in the Indicative Content. The form and style are of a high standard and specialist terms are used appropriately most of the time.	[3]–[4]
Candidates describe in detail using good spelling, punctuation and grammar **at least one** of the points in the Indicative Content. The form and style are of a satisfactory standard and they have made some reference to specialist terms.	[1]–[2]
Response not worthy of credit.	[0]

[6]

					AVAILABLE MARKS
		(iii)	Curve of decreasing gradient [1] Through origin [1]	[2]	20
4	**(a)**	**(i)**	Arrow vertically DOWN	[1]	
		(ii)	One straight line (through core) and out [1] Two loops, one above one below from one end to the other [2] Direction from the right end to the left end one arrow [1]	[4]	



Conflicting arrows – no credit for direction
Crossing or touching line [–1]

	(b)	**(i)**	D.C. – flows in only one direction [1] A.C. – reverses or changes direction [1] regularly (or repeatedly) [1]	[3]	
		(ii)	Top diagram – A.C. [1] Bottom diagram – A.C. [1]	[2]	
	(c)	**(i)**	Iron	[1]	
		(ii)	(In order) – step-up, increase, step-up	[3]	
		(iii)	Step-up	[1]	15

					AVAILABLE MARKS
5	(a)	(i)	1 – Asteroids; 2 – Neptune; 3 – Venus; 4 – Saturn $\left[\frac{1}{2}\right]$ each round up	[2]	
		(ii)	**Rocky planet** – Mercury, Earth or Mars or Venus **Gaseous planet** – Jupiter or Uranus or Saturn or Neptune Both required	[1]	
		(iii)	Hydrogen, helium both needed H or He accept symbols	[1]	
		(iv)	(Nuclear) fusion correct spelling	[1]	
	(b)		Geocentric – planets and Sun revolve around the Earth, but in Heliocentric planets revolve around the Sun.	[1]	
	(c)	(i)	The (Catholic) Church/The Pope	[1]	
		(ii)	Retrograde/apparent looping motion of the planets; Venus is sometimes closer to Earth than Mars/phases for Venus and Mars/planets phases of Moon Any **one**	[1]	
	(d)		Flight time too long for a human lifetime (accept today's spacecraft too slow) Spacecraft could not carry sufficient food stocks. Spacecraft could not carry sufficient fuel stocks. Little to no chance of return to Earth should a problem arise. Long time delay in relaying of signals/messages between Earth and craft. Any **two** points Any acceptable realistic answer	[2]	10
6	(a)		From the top: crust mantle inner core outer core	[4]	
	(b)		The plates move or rub against each other They stick/catch There is a sudden movement/jerk/jolt/lurches/sudden release	[3]	
	(c)		Friction between plates (heats and melts) the rock/crust/plates Magma lava	[3]	10
				Total	**90**