



**General Certificate of Secondary Education
2022**

GCSE Physics

Unit 1
Foundation Tier

[GPY11]

TUESDAY 7 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 of 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.

COVID-19 Context

Given the unprecedented circumstances presented by the COVID-19 public health crisis, senior examiners, under the instruction of CCEA awarding organisation, are required to train assistant examiners to apply the mark scheme in case of disrupted learning and lost teaching time. The interpretation and intended application of the mark scheme for this examination series will be communicated through the standardising meeting by the Chief or Principal Examiner and will be monitored through the supervision period. This paragraph will apply to examination series in 2021–2022 only.

			AVAILABLE MARKS
1	(a)	(Average) speed = Distance/time or symbols = 400/50 = 8 (m/s)	[1] [1] [1] [3]
	(b) (i)	(Distance) = area under graph or = ave speed $\times$ time = $\frac{1}{2} \times 9 \times 3$ = $\frac{1}{2} (9 + 0) \times 3$ = 13.5 (cm) = 13.5 (cm)	[1] [1] [1] [3]
	(ii)	Rate of change of speed = Change of speed/time = 9/3 = 3 cm/s ²	[1] [1] [1] [3]
	or		
		Rate of change of speed = slope of the graph = 9/3 = 3 (cm/s ²)	
	(c) (i)	When in equilibrium (balanced) About the same point or pivot Clockwise moments equal anticlockwise moments	[1] [1] [1] [3]
	(ii)	ACM = CM 4 $\times$ 30 = W $\times$ 40 W = 3 (N)	[2] [1] [3]
	(iii)	To the right or towards the pivot	[1]
	(d)	A sharp knife blade has a small (contact) area So it has a large pressure	[1] [1] [2]
			18

- 2 (a) Weight down [1]
 Reaction up [1]
 They are equal [1] [3]
- (b) (i) Constant speed [1]
- (ii) 50 (N) [1]
 To the LEFT [1] [2]
- (c) $F = ma$ [1]
 $1200 = 2000 \times a$ [1]
 $a = 0.6 \text{ (m/s}^2\text{)}$ [1] [3]
- (d) $F = ke$ or $k = F/e$ or $k = \text{gradient}$ [1]
 $k = 8/16$ [1]
 $= 0.5$ [1]
 Unit = N/cm [1] [4]
- (e) The point
 Where the weight of the bus acts
 The lower the CoG the more stable the bus
 The width of the base/distance across the bus wheel to wheel
 This raises the CoG
 The weight acts outside the base/wheel
 This causes a turning effect

Candidate describes in detail using good spelling, punctuation and grammar 5 or more points shown above. The form and style are of a high standard and specialist terms are used appropriately at all times.	[5]–[6]
Candidate describes in detail using good spelling, punctuation and grammar 3 or 4 points shown above. The form and style are of a high standard and specialist terms are used appropriately at all times	[3]–[4]
Candidates make some reference to 1 or 2 of the main points shown above using satisfactory spelling, punctuation and grammar. 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

19

- 3 (a) Density = Mass/Volume or $D = M/V$
 $= 120/(235 - 220)$
 $= 8$
Unit g/cm^3

[1]
[2]
[1]
[1] [5]

(b) (i)

Statement	
The particles have large gaps between them and are entirely free to move.	Gas
The particles are mainly touching but have small gaps between them.	Liquid
The particles have strong forces between them.	Solid

[1]
[1]
[1] [3]

- (ii) Electron
Collisions with other particles

[1]
[1] [2]

AVAILABLE
MARKS

10

	AVAILABLE MARKS
4 (a) Two words only circled MASS and POWER (deduct [1] for each word circled greater than 2)	[2]
(b) Diagram C Work = Force $\times$ distance or PE = mgh	[1] [1] [2]
(c) (i) Energy can be changed from one form to another The total amount of energy does not change Energy cannot be created or destroyed (worth 2 marks)	[1] [1] [2]
(ii) Output energies LIGHT SOUND HEAT HEAT	[3] [1] [4]
(iii) Efficiency = Useful output energy/Total input energy 0.75 = Useful output energy/200 Useful output energy = 150 (J)	[1] [1] [1] [3]
(d) (i) $E_p = mgh$ $= 200 \times 10 \times 40$ $= 80\,000 \text{ (J)}$	[1] [1] [1] [3]
(ii) $E_k = \frac{1}{2} mv^2$ $= \frac{1}{2} \times 200 \times 20^2$ $= 40\,000 \text{ (J)}$	[1] [1] [1] [3]
(e) Can A The matt black is the better radiator	[1] [1] [2]
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5 (a)

Name of particle	Position in atom	Relative Electrical charge	Relative Mass
<i>proton</i>	<i>In the nucleus</i>	+ 1	1
<i>neutron</i>	In the nucleus	0	1
electron	Orbits the nucleus	-1	$\frac{1}{1836}$

$[\frac{1}{2}]$ each round up

[3]

(b) (i) Background radiation

[1]

(ii) Surroundings, e.g. rocks, people, cosmic ray

[1]

(iii) Range (0) to 2.5 or 3.0 cm

[1]

(c) Any **two** from:

Protective clothing

Handle at a distance, e.g. tongs

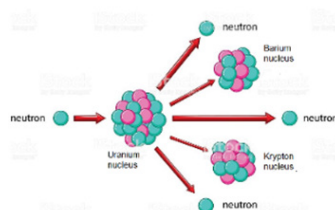
Minimise exposure

[2]

(d) Nuclear Fission

Power station/

Generating electricity

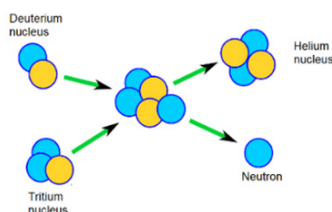


[1]

[1]

Nuclear Fusion

Source of a star's energy



[1]

[1] [4]

Total

12

80

Source: Chief Examiner