



Rewarding Learning

**General Certificate of Secondary Education
2015–2016**

Science: Single Award

Unit 3 (Physics)

Higher Tier

[GSS32]

WEDNESDAY 25 MAY 2016, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

			AVAILABLE MARKS	
1	(a) (i)	Works as a driver	[1]	6
	(ii)	Increases [1] alcohol slows brain/reaction time increases [1]	[2]	
	(b) (i)	The distance covered from when brakes are first applied until the vehicle stops	[1]	
(ii)	Increases	[1]		
(iii)	13 m	[1]		
2	(a) (i)	Any two from: • no output until 5 m/s • increased output as wind increases from 5 up to 17.5 m/s/1200 W • levels off at 1200 between wind speeds of 17.5 or 20 m/s • drops after 20 m/s	[2]	
	(ii)	The blade moves the magnet [1] inside the coils of wire [1]	[2]	
	(b)	Advantage – less fossil fuels used/less global warming/no air pollution [1] Disadvantage – unsightly/noise [1]	[2]	
	(a) (i)	For comparison/show (background) radiation	[1]	
3	(ii)	Two	[1]	7
	(b)	Gamma radiation [1] as could infect patients [1] kill microbes/sterilize [1]	[3]	
	(c)	Activity falls time 7 [1] and then stays the same after day 7/15 CPM	[2]	

4 (a) Indicative content

- current model is heliocentric
- Sun in the centre
- planets orbit the Sun
- name and position of planets 1 Any
- name and position of planets 2 Any other
- geocentric is the previous model/old model
- Earth in centre in geocentric model/old model
- geocentric model had fewer planets/different order

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe fully the Solar System using seven or eight of the points above, in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates use some appropriate specialist terms to describe the Solar System using four to six of the points above, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe the Solar System using one to three of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and have made limited use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

(b) (i) A (huge) collection of stars/solar systems

[1]

(ii) Milky Way

[1]

8

5 (a) Current too high [1]

the (fuse) **wire** melts/breaks [1]

breaks circuit/incomplete circuit/stops flow [1]

[3]

(b) (i) All points correct [2] (five points correct 1) correct line [1]

[3]

(ii) 11.5

[1]

(iii) 240×5 [1]
1200 [2]

[2]

(c) Faster/can be reset/don't need replaced/no cost to reset

[1]

10

			AVAILABLE MARKS	
6	(a)	Conventional current flows from positive to negative [1] High to low potential [1]	[2]	8
	(b) (i)	Any two from: • as length of wire increases, resistance increases • as resistance increases, current decreases	[2]	
	(ii)	Straight line of best fit (ignoring anomaly)	[1]	
	(iii)	As voltage increases, current increases (converse)	[1]	
	(iv)	8/1.6 [1] 5 [2]	[2]	
7	(a) (i)	6500 + 1500 [1] 8000 [2]	[2]	8
	(ii)	Resultant forward force = (1500 N)/unbalanced forces [1] car is accelerating/increasing speed [1]	[2]	
	(b) (i)	Less force exerted on driver [1] Longer time to stop [1]	[2]	
	(ii)	A zone in a car that collapses (slowly) [1] so absorbs energy [1]	[2]	
8	(a) (i)	Any two from: • both measure distance • both measure time • both repeat and average • both use formula	[2]	10
	(ii)	Any two from: • echoes replaced by car/no reflection in flash-bang • involves sound and light • doesn't involve dividing by two	[2]	
	(b)	Vibrates [1] Moves: up and down/left right/back and forth/at right angles to the direction of travel [1]	[2]	
	(c)	Any two from: • microwaves penetrate food • water molecules (absorb microwaves) • vibrate faster/more	[2]	
	(d)	X-rays have more energy/converse [1] more energy means more likely to cause cancer/tumours/mutations [1]	[2]	

9 Indicative content

- can see close objects clearly/focus
- distant objects appear blurry/not focus
- as lens is too strong/thick/eyeball too long
- light refracted too much
- focuses before the retina
- corrected by a concave/diverging lens
- spreads out light/diverge
- focus on retina

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe fully short sight and its correction using more than six of the points above, in a logical sequence. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
B	Candidates use some appropriate specialist terms to describe short sight and its correction using four to six of the points above, in a logical sequence. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
C	Candidates describe short sight and/or its correction using one to three of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and have made limited use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6]

6

10 (a) (i) 100	[1]
(ii) 2005	[1]
(b) Limited mileage/lack of recharge points/longer to recharge	[1]
(c) Increasing use of diesel cars [1] diesel is a fossil fuel [1] amount of fossil fuels limited/contributes to global warming [1]	[3]

Total**75**