Rewarding Learning

General Certificate of Secondary Education
2018–2019

Single Award Science
Physics

Unit 3
Higher Tier

[GSA32]

FRIDAY 1 MARCH 2019, MORNING

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)	Alpha stopped by 3 cm air [1] beta stopped by aluminium [1] [2]	
	(b)	Protons + neutrons [1] unstable [1] nuclei [1] [3]	5
2	(a)	Gas/coal [1]	
	(b) (i)	Non-renewable sources will run out [1]	
	(ii)	Uranium [1]	
	(iii)	Fission [1]	
	(c)	23% [1]	
	(d) (i)	As the years go on there is an increase in the **percentage** of electricity **generated** increases [1]	
	(ii)	Wind/wave/solar or other suitable [1]	7

AVAILABLE MARKS

3 (a) (i) 21 [1]
75 [1] [2]

(ii) All points [2] 4 points [1]
curve [1] [3]

(iii) 45 ± 1 (allow e.c.f.) [1]

(iv) Same shape [1] starting at (0,0) always above [1] [2]

(b) Indicative content:

- Thumb and finger either side of 0 cm
- One drops ruler other catches it
- As soon as possible
- Change roles
- Repeat several times and **average**
- Shorter distance – shorter reaction time
- Reactions increase by drugs, alcohol, tiredness (Max. 2)

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain fully reaction time (using **six or more** of the above points) 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 and explain reaction time (using **four or five** of the above points) 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/explain reaction time (using **one to three** of the above points). They use limited spelling, punctuation and grammar and have made little use of specialist scientific terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

[6] 14

					AVAILABLE MARKS
4	(a)	(i)	Ultrasound	[1]	
		(ii)	SONAR	[1]	
		(iii)	Vibrate [1] same direction of wave [1]	[2]	
	(b)		1000 × 1.5/1 × 1.5 [1] 1500 [2]	[2]	
	(c)		Should have halved time/doubled distance	[1]	
	(d)		Stopwatch starts light when seen [1] stopped when bang is heard [1]	[2]	9
5	(a)	(i)	Up arrow	[1]	
		(ii)	Electrons [1] negative [1] repelled from negative side [1]	[3]	
	(b)	(i)	R = V ÷ I or R = 4 ÷ 0.5 [1] 8 [2]	[2]	
		(ii)	Wire 3	[1]	7
6	(a)		Kinetic increases [1] Gravitational potential increases [1]	[2]	
	(b)		450 × 10 × 3.6 [1] 16 200 [2] Joules [1]	[3]	
	(c)		Energy can only be changed from one form to another. Cannot be created or destroyed	[1]	6
7	(a)	(i)	Completely covered in plastic [1] plastic is an insulator [1]	[2]	
		(ii)	Correct power [1] correct conversion [1] 0.05 [3]	[3]	
	(b)		Step up transformer	[1]	6

				AVAILABLE MARKS
8	**(a)**	Huge collection of stars	[1]	
	(b)	**(i)** As distance from our Galaxy increases, speed away increases	[1]	
		(ii) Distance light travels in 1 year	[1]	
	(c)	A [1] red shift [1] more [1]	[3]	6
			Total	**60**