Rewarding Learning

General Certificate of Secondary Education
2013–2014

Science: Single Award

Unit 3 (Physics)

Higher Tier

[GSS32]

WEDNESDAY 26 FEBRUARY 2014, 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	**(i)** The longer the flight the greater the dose [1]	
	(ii) Cosmic [1]	
	(iii) $\frac{2000}{50}$ [1]	
	40 ÷ 2 = 20 [1] [2]	
	(iv) Damage cell [1] cause cancer [1] [2]	6
2	**(a)** **(i)** All points correctly plotted [2] (4 points correctly plotted [1]) curve of best fit [1] [3]	
	(ii) 3 days [1]	
	(b) $\frac{1}{4}$ [1]	5
3	Indicative content • clouds • hydrogen • pulled together • by gravity • helium formed • nuclear fusion [6]	

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain fully (using **five or six** of the above points) star formation 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 star formation (using **three or four** 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 star formation using **one or two** of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

6

					AVAILABLE MARKS
4	(a)	(i)	Lower output power [1] Less life expectancy [1] Higher generating costs [1]	[3]	
		(ii)	Reduce the use of fossil fuels [1] Renewable **or** do not cause reduction in air quality **or** do not contribute to Greenhouse effect [1]	[2]	
	(b)		Millions of years [1] high pressure/compression [1]	[2]	
	(c)		C	[1]	8
5	(a)	(i)	0.2 m	[1]	
		(ii)	0.1 m	[1]	
	(b)		Particles vibrate [1] at right angles to direction of wave movement [1]	[2]	
	(c)	(i)	1500×6 [1] 1500×3 [1] 4500 m [1]	[3]	
		(ii)	echo returns quicker	[1]	
	(d)		$\frac{1500}{30000}$ [1] 0.05m [1]	[2]	10
6	(a)		Skull thinner [1] microwaves penetrate further [1]	[2]	
	(b)	(i)	Further away less SAR [1] Bigger affect at less 1.4 [1]	[2]	
		(ii)	Any **two** from: • less time on phone • ear phones • texting • instant message via wifi (app) • loudspeaker	[2]	6

AVAILABLE MARKS

7 **(a)** Indicative content

- ammeter in series
- voltmeter in parallel
- across the wire
- change thickness
- same type of wire
- keep wire same length
- resistance = voltage/current
- thicker the wire the lower the resistance [6]

Band	Response	Mark
A	Candidates must use appropriate specialist terms throughout to describe and explain fully (using **six or more** of the above points) the experiment 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 the experiment (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 the experiment 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 they have made little use of specialist terms. The form and style are of a limited standard.	[1]–[2]
D	Response not worthy of credit.	[0]

(b) **(i)** Increase the length (resistance) of wire decreases current [1]

(ii) volume knob/dimmer switch on light [1]

(c) ◄——— [1] 9

				AVAILABLE MARKS
8	**(a)**	56 000/3500 [1] 16 [1]	[2]	
	(b)	crumple zone/air bag	[1]	
	(c)	Substitutes are used instead of fossil fuels [1] extenders are added to fossil fuels [1]	[2]	
	(d)	Substitute, any one from • biodiesel • hydrogen [1]		
		Extender – alcohol [1]	[2]	
	(e)	**(i)** Accelerating [1] unbalanced force [1]	[2]	
		(ii) 0 N	[1]	10
9	**(a)**	each lens 1 mark [1] passage of ray through air [1]	[2]	
	(b)	close objects are not clear [1] liquid pumped into lens [1] forming convex lens [1]	[3]	5
10	**(a)**	**(i)** heliocentric	[1]	
		(ii) Sun is at the centre	[1]	
	(b)	13.5–14 billion years	[1]	
	(c)	Steady State Theory	[1]	
	(d)	moving faster [1] further away [1]	[2]	6
11	**(a)**	visible	[1]	
	(b)	gamma ray [1] highest frequency [1] have more energy [1]	[3]	4
			Total	**75**