AQA

LEVEL 3 CERTIFICATE AND EXTENDED CERTIFICATE

APPLIED SCIENCE

ASC1/P

Key Concepts In Science – Physics

Mark scheme

January 2018

Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Marking methods

In fairness to candidates, all examiners must use the same marking methods. The following advice may seem obvious, but all examiners must follow it as closely as possible.

1. If you have any doubt about how to allocate marks to an answer, consult your Team Leader.

2. Refer constantly to the mark scheme and standardising scripts throughout the marking period.

3. Use the full range of marks. Don't hesitate to give full marks when the answer merits them.

4. The key to good and fair marking is consistency.

Introduction

The information provided for each question is intended to be a guide to the kind of answers anticipated and is neither exhaustive nor prescriptive. All appropriate responses should be given credit.

Where literary or linguistic terms appear in the Mark Scheme, they do so generally for the sake of brevity. Knowledge of such terms, other than those given in the specification, is not required. However, when determining the level of response for a particular answer, examiners should take into account any instances where the candidate uses these terms effectively to aid the clarity and precision of the argument.

Descriptions of levels of response

The following procedure must be adopted in marking by levels of response:

- read the answer as a whole

- work up through the descriptors to find the one which best fits

- where there is more than one mark available in a level, determine the mark from the mark range judging whether the answer is nearer to the level above or to the one below.

Since answers will rarely match a descriptor in all respects, examiners must allow good performance in some aspects to compensate for shortcomings in other respects. Consequently, the level is determined by the 'best fit' rather than requiring every element of the descriptor to be matched. Examiners should aim to use the full range of levels and marks, taking into account the standard that can reasonably be expected of candidates.

Question	Answers	Additional Comments/Guidelines	Mark
01.1	Biomass, geothermal, wave, wind	All must be correct for the mark	1
01.2	167000 x 9.8 x 360 (correct working shown)		1
	589 000 000 or 589 x 10^6	an answer of 589 176 000 / 589.176 x 10^6 / 590 000 000 scores 2 marks	1
	(Unit) J or Joules or J/s or W	accept MJ / Megajoules / kJ / kilojoules numerical answer must match units given to gain 3 marks	1
01.3	$\frac{440}{589}$	allow ecf from Question **01.2**	1
	0.75 (0.747… or 0.746…) or 75% (74.7% or 74.6%)	allow 0.75% (0.747…% or 0.746…%) (wrong unit) 75 (74.7 or 74.6) (no unit) for 1 mark An answer of 0.75 or 75% scores 2 marks	1
01.4	Any **two** from: • friction • heat • resistance (in wires of generator) • sound (of water / turbines)	ignore 'noise'	2

01.5	Nuclear fission		1
	(produces heat energy heats water in the boiler to) produce steam		1
	(Steam) turns a turbine (which turns a generator)		1
	Generator transfers kinetic energy to electrical energy		1

Question	Answers	Additional Comments/Guidelines	Mark
01.6	any **one** from: • CO_2 released by machinery mining uranium ore • Large amounts of harmful radiation could be released in an accident • Nuclear waste remains radioactive for a long time • Nuclear waste needs to be stored safely • Nuclear waste is damaging to the environment	do **not** accept answers which simply state 'they are dangerous'. ignore any reference to cost.	1

Total			**13**

Question	Answers	Additional Comments/Guidelines	Mark
02.1	Lowest total resistance: D Highest total resistance: B		1 1
02.2	Correct voltmeter symbol drawn in parallel with either one of the resistors.		1
02.3	$\frac{12}{20}$ or $\frac{6}{10}$ (correct working) 0.6	an answer of 0.6 scores 2 marks if no other mark awarded, allow total resistance of 20Ω calculated for 1 mark	1 1
02.4	6		1
02.5	Any **one** from: • Energy/voltage wasted or lost in wires / ammeter (due to resistance) • Ammeter has some resistance • Resistance of voltmeter is not infinite • Voltmeter is not calibrated correctly / has a zero error / has a systematic error **OR** there is a fault with the voltmeter • Internal resistance in cell/battery	do **not** accept 'experimental error'	1
Total			7