

Mark Scheme (Results) Summer 2007

GCSE

GCSE Science (1522/3F)

USING THE MARK SCHEME

1. This mark scheme gives you;
 - * an idea of the type of response expected
 - * how individual marks are to be awarded
 - * the total mark for each question
 - * examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are **alternatives** and either answer should receive full credit.
4. () means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

MARKING

1. You must give a tick (in red) for every mark awarded. The tick must be placed on the script close to the answer. The mark awarded for part of a question should be written in the margin close to the sub-total.
2. The sub-total marks for a question should be added together and the total written and ringed at the end of the question then transferred to the front of the script.
3. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
4. **Do not** award marks for repetition of the stem of the question.
5. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

AMPLIFICATION

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.

QUALITY OF WRITTEN COMMUNICATION

Students will be assessed on their ability to:



present relevant information in a form that suits its purpose

ensure that spelling, punctuation and grammar are accurate, so that the meaning is clear

use a suitable structure and style of writing.

Q1	(a)	electrical/thermal(heat); light/ thermal(heat);	2
	(b)	kinetic(movement/motion); gravitational(potential); thermal(heat)/ sound; chemical;	4
			Total 6 marks
Q2	(a)	comet; Earth; Sun; Venus; [Deduct one mark for each additional response beyond the four required]	4
	(b)	gravity / pull of the Earth / gravitational (pull) / attraction to Earth/centripetal;	1
			Total 5 marks
Q3	(a)	230 x 2; = 460 (W);	2
	(b)	2.8;	1
	(c)	(energy =) power x time [either in words, abbreviations or numerical values]; = 1.4;	2
	(d) (i)	blue;	1
	(ii)	brown;	1
	(iii)	An explanation to include any two from: 1. dishwasher casing a conductor/metal; 2. food processor casing an insulator/ does not conduct / double insulated; 3. correct function of earth wire [eg: protects against shock];	3
			Total 10 marks
Q4	(a)	horizontal arrows; in opposite directions;	2
	(b) (i)	(number of) oscillations/sec or cycles/sec or waves/sec or correct reference to pitch;	1
	(ii)	Hz;	1
	(c)	(ultrasound) frequency / pitch; above human range / 20 kHz;	2

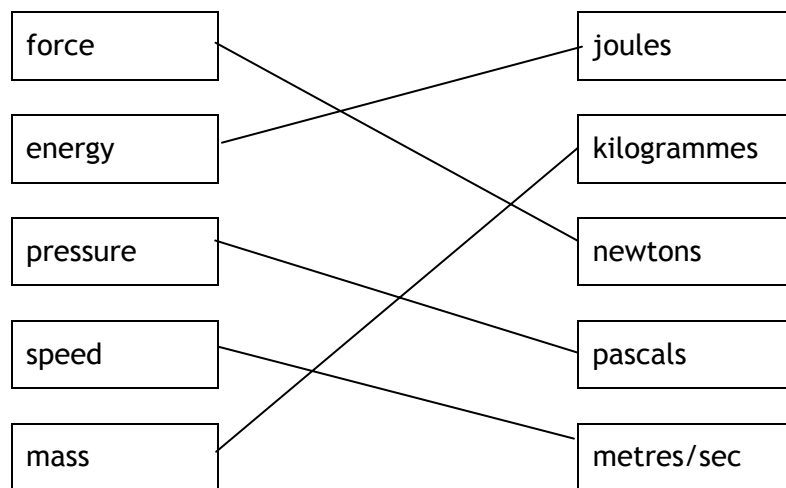
- (d) (i) reads 600m from graph;
depth 300 m;
[the unit must be present at least once] 2
- (ii) one correct use from
range finding / cleaning [eg; jewellery] / medical [eg; scan of foetus]
/ other acceptable [eg; dog whistle]; 1

Total 9 marks

- Q5 (a) Labelled arrows showing:
weight of block/pull of earth/gravity [downwards]; 2
reaction from table/push of table / upthrust [upwards];
- (b) Labelled arrows showing:
weight [acting vertically down];
reaction of table [at 90° to surface]; 3
frictional force [parallel to and up the slope];
- (c) (i) An explanation to include:
1. (component of) weight (acting down the slope);
2. (is)greater than frictional force / friction has a maximum value; 2
- (ii) A description to include:
1. gravitational potential energy;
2. to kinetic energy (as it slides); 3
3. thermal energy (due to friction);


Total 10 marks

Q6



Total 5 marks

- Q7 (a) A description to include two from :
fast;
random/haphazard motion/move freely; 2
collisions (with walls/each other);
- (b) speed would be less/slower **or** less/fewer collisions; 1
- (c) lower the temperature of /cool the gas; 1

	(d)	a force / pressure;	1
			Total 5 marks
Q8	(a)	in series; correct symbol  ;	2
	(b)	(i) $V = IR$ [or $I = V/R$ or $R = V/I$] or 0.4×20 ; (but no marks for the “triangle” mnemonic)	1
		(ii) 0.4×20 ; 8 V ; (note the correct unit must be given)	2
	(c)	(i) points;; (note one mark lost for each incorrectly plotted point within a tolerance of one small square) curve; note: ignore a line drawn or continued outside the range of the readings	3
		(ii) line which is always below the first curve;	1
			Total 9 marks
Q9	(a)	no change in direction at first surface; correct reflection at second surface;	2
	(b)	red;	1
	(c)	(i) infra-red;	1
		(ii) radio/tv;	1
	(d)	ticks in boxes 1,4,6 ;;;	3
	(e)	A suggestion to include any two from: amount of diffraction depends on λ ; λ microwaves $>$ λ X rays; need very small gap for X ray diffraction; could argue in terms of ratio λ/d ;	2
		[Ignore references to frequency]	
		plus one communication mark for ensuring that spelling, punctuation and grammar are accurate so that the meaning is clear;	1
			Total 11 marks

- (a) GM tube; 1
- (b) (i) background radiation (or any correct specific source of background radiation) ; 1
- (ii)
- | | type of ionising radiation | charge | |
|----------|----------------------------|-------------------|---|
| source 1 | alpha; | positive; | |
| source 2 | beta; | negative | |
| source 3 | gamma | no charge; | 4 |
- (c) (i) 95; 1
- (ii) 146; 1
- (iii) A suggestion to include any two from:
 1. α short range;
 2. α easily stopped by smoke in air;
 3. α good ioniser;
 4. α absorbed by casing; 2
- [Allow reverse argument in each case
 for example: β or γ would penetrate casing. Ignore references to dangers/safety]

Total 10 marks

- Q11 (a) (i) distance travelled;
 whilst thinking about action to take (owtte); 2
- (ii) $9/15 = 0.6$;
 $15/25 = 0.6$;
 $21/35 = 0.6$;
 [Allow reverse calculation in each case : eg $21 = 35 \times 0.6$] 3
- (iii) Any two from:
 drugs [named or in general and including alcohol] ;
 plausible distractions [example mobile phone use];
 driver characteristics [example age, medical condition];
 fatigue/tiredness; 2

- (b) (i) distance needed to bring car to a halt once brakes applied; 1
- (ii) **Either** an explanation in terms of energy to include two from: 2
1. car has more (kinetic) energy;
 2. more work has to be done by the brake;
 3. for constant / same force (this requires greater distance);
 4. takes more time to come to rest (so covers more distance);
- or an explanation in terms of force to include two from
1. force is same in each case/force remains constant;
 2. deceleration same in each case/remains constant;
 3. takes more time to come to rest (so covers more distance);

Total 10 marks

TOTAL MARK 90