



General Certificate of Education

Applied Science

8771/8773/8776/8779

SC02 Energy Transfer Systems

Report on the Examination

2008 examination - January series

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Question 1

- (a)(i) Mostly correct answers but often 'respiration' was incorrectly given.
- (ii) Lungs/pulmonary vein mostly correctly given but a large number of answers referred to the heart.
- (iii) Mostly correct.
- (b) This part of the question was well answered across the range of marks but also served as a good discriminator. The more able candidates made the connection between a reduced surface area in the alveoli of emphysema sufferers being responsible for reduced gaseous exchange and hence less oxygen, which resulted in less energy for movement.
- (c)(i) Again a good discriminating part of the question where the more able candidates correctly described the pulmonary and systemic circulations, and the less able candidates described only one part of the circulation or merely stated that 'during each cardiac cycle the blood travels through the heart twice'.
- (ii) Mostly correct.

Question 2

- (a) Mostly correct identification of EEG traces.
- (b)(i) Points plotted correctly in most cases, however the scales were not always suitable. Also, the axes were sometimes reversed and not correctly labelled. For example, the 'x' axis was often labelled only as 'min', rather than 'Time (min)'; the 'y' axis was often labelled 'beats per min' rather than 'Pulse rate (beats per min)'. The reversal of axes and/or incorrect labelling resulted in candidates failing to gain marks.
- (ii) Mostly well answered although there were some incorrect references to 'breathing rate'. Also, many candidates failed to refer to the data in their answer, even though this was in the stem of the question.
- (c)(i) Most answers gained three out of the four possible marks, many failing to refer to either 'ATP' or 'mitochondria'. Some chose to describe how oxygen was inhaled and reached the blood, thus missing the point completely.
- (ii) The chemical equation mostly correctly written but in some cases a word equation was given instead.
- (d) Mostly a correct example for physical status was given.

Question 3

- (a)(i) Temperature mostly within the accepted range.
- (ii) Temperature mostly within the accepted range.
- (b)(i) Temperature at which heat stroke would start to develop was often given correctly as 38 °C, but candidates who wrote 'above 38 °C' failed to gain this mark as this statement was not acceptable.
- (ii) As with (b)(i) 43 °C was often correctly given but when accompanied by 'above' did not gain the mark.
- (c) Most answers gained three out of the four marks available although only the more able candidates made any mention of Latent Heat, the fact that the temperature returns to normal, or that negative feedback was involved.
- (d) Mostly two out of three correct examples given, although many incorrect answers which referred to radiation, conduction or convection. Also, despite the fact that the stem asked for three other ways in which heat is lost from the body, other than through the skin, many answers mentioned sweating and so failed to gain the mark.

Question 4

- (a) Gravitational (energy) mostly given, although many incorrect answers referring to 'kinetic' energy.
- (b) The more able candidates gained the full two marks, while the less able often gained one mark for correct substitution. Many instances where marks were incorrectly transferred from one stage of the calculation to another.
- (c) Many weak answers, demonstrating a poor understanding of the topic.
- (d) Friction (of sand) was often correctly realised to be a reason for the train stopping, although little mention was made of the fact that heat may be produced (from kinetic energy) or that the train decelerates.
- (e) Well answered on the whole.
- (f)(i) The full two marks were mostly gained. Where no marks were awarded this was often because the candidate had failed to square the '8' in the equation: $\frac{1}{2} \times 2500 \times 8^2$
- (ii) Many candidates gained full marks as they were allowed to carry an error forward from their answer to (f)(i). In addition, many were awarded a mark for the units only, as this was a stand alone mark.

Question 5

- (a)(i) Mostly correct although some inappropriate examples such as 'nuclear' given as the form in which energy is stored in a battery.
- (ii) Mostly two correct forms of energy given.
- (b) Calculation mostly correct across the range of abilities.

Question 6

- (a) Poorly answered with a maximum of one mark being allocated for mentioning that there is a longer heat path or that less heat enters. Instead answers often talked about 'less heat being lost'. Very rarely was any reference made to there being a lower U-value.
- (b) Material suitable for use as an insulator was often correctly given, with reference to trapped air. However, only the more able candidates mentioned small air pockets preventing convection currents.
- (c) Mostly correct reference to the fact that cold air falls / hot air rises although little understanding of the mechanisms involved was demonstrated. Candidates are still writing about 'heat rising' despite the fact that this has been pointed out in previous examiner's reports.
- (d) Mostly correct.
- (e) Most answers correctly stated that heat is not easily removed (by the heat pump), but often failed to obtain the second marking point.
- (f) Many comprehensive answers demonstrating a good understanding of the principles involved. A good discriminating question.
- (g) Most answers gained at least one of the possible two marks for the calculation. Many gained both marks.

Question 7

- (a)(i) Most answers gained at least one of the two marks.
- (ii) Most candidates correctly said to ask the pilot for the take-off speed.
- (b) The more able candidates gave a correct precaution needed to ensure that the data were valid.
- (c) A good discriminator in that the more able candidates correctly talked about CO₂ pollution, greenhouse gases, carbon emissions, global warming, or the fact that cheap mass air travel uses up (non renewable) fossil fuels.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.