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General Certificate of Education

Applied Science 8771/8773/8776/8779

SC02 Energy Transfer Systems

Report on the Examination

2008 examination - June series

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General Comments

The performance on this paper compared well with that of last year. There was a good spread of marks indicating that the paper was accessible to more able and less able candidates alike.

However, it is disappointing that centres are failing to use the most up-to-date specification when teaching this unit, and hence failing to update candidates regarding normal expected values for physiological parameters. The latest version of the specification can be found on the AQA website.

In addition, mistakes continue to surface that should no longer do so. Frequent errors such as the use of 'heat rises' instead of 'hot air rises' have been addressed in earlier examiner's reports, but appeared again in this paper.

Question 1

(a) Mostly two correct examples provided.

(b) Most answers gained the mark by stating that there would be a reduction in the number of chest infections, however some said, incorrectly, that there would be no further chest infections. Many answers also said that digestion was improved.

(c) Mostly correct, although some candidates thought that the girl's reading would be higher than the normal value. This suggested that they had little concept of the correct values even though these are in the specification.

(d)(i) Good understanding generally that the mucus traps dirt and prevents it from reaching the lungs. However, an alarming number of candidates seemed to think that the trachea is part of the digestive system and referred to dust being prevented from entering the stomach.

(ii) Mostly correct although the spelling was very variable in most instances.

(e)(i) Only about half the candidates correctly gave spirometer, other answers included sphygmomanometer and respirometer.

(ii) Mostly a correct value was given. As the question did not ask for a range, any value between 400 and 500 (cm^3) was allowed. Some candidates ignored the units provided with the question and gave values that were incompatible with cm^3.

(iii) The expected value here was 3.1(dm^3). However, it appears that some centres have not taught this using the more up-to-date version of the specification. Allowances were made for this and, on this occasion only, 4.25 (dm^3) was accepted, as were all values in between 3.1 and 4.25. A very common incorrect answer was 4.5.

Question 2

(a)(i) Mostly correct reference to the use of oxygen, although occasionally 'air' was incorrectly cited. Answers which gave 'in the presence of oxygen' were not credited.

(ii) Most answers gained two marks for the equation but failed to gain the mark allowed for balancing the equation. Many candidates have a very poor knowledge of formulae, often writing CO^2 rather than CO_2 and glucose with the 6 and 12 written as powers instead of subscripts.

(iii) One mark was often gained for correct substitution but the answer often incorrectly calculated to two significant figures i.e. 0.7 correct; 0.699 correct; 0.69 incorrect.

(b)(i) Mostly correct.

(ii) Some candidates failed to gain marks for referring to more air being consumed as opposed to more oxygen. Also, mention of 'oxygen being consumed', rather than 'more oxygen' failed to gain the mark.

(c)(i) Mostly correctly identified.

(ii) Apart from the more able candidates, there was extremely poor understanding of the fact that carbon dioxide would no longer be absorbed, following the removal of potassium hydroxide.

Question 3

(a)(i) Mostly correct range given although some candidates provided a single value only and failed to gain the mark.

(ii) Disappointingly,very few candidates were aware that the time taken for heart rate to return to normal is a measure of cardiovascular fitness. Consequently, they failed to get the mark here and for (a) (iii).

(iii) Please see comments for (a) (ii).

(b) Tachycardia often given correctly, although some spellings of the word were extremely poor and could not be clearly deciphered and so did not receive a mark. The less able candidates demonstrated a poor understanding of heart traces, sometimes giving 'bradycardia' or 'arrhythmia' as their answer.

(c) Answered well by the more able candidates who gained all three possible marks. Many answers confused the sequence of events by referring to impulses travelling from the SAN to the medulla, rather than the other way round. A few answers talked of the lungs and heart system.

(d) Mostly correct values given.

(e) Even though participant C was the most obvious choice here, other participants could also be considered. Credit was given where candidates correctly highlighted the reasons for their choice.

(f) The more able candidates gave two correct examples of the role of the elastic and muscle tissue, while less able candidates tended to confuse the roles of these two tissues.

(g) Mostly correct.

Question 4

(a) Often two marks gained here, with very few candidates mentioning that the silver reflects radiation, thus failing to gain the second mark point. A number of candidates had remembered that metals are good conductors and thought that the foil behind would some how heat up 'convecting' more heat into the room.

(b) Mostly correct.

(c) Mostly answers correctly gave 'hot air rises / convection / so upper air would be hottest'. However, despite the fact that it has been repeatedly highlighted in previous examiner's reports, answers are still appearing that refer to 'heat rises', which fails to gain the mark.

(d) Mostly very well answered, with most answers gaining two marks. Candidates often failed to mention that the air is trapped in the foam in small pockets. Many less able candidates talked of the air pockets trapping heat and missed making the link to it only stopping convection.

(e) Mostly two correct examples given.

(f) Most answers gained two of the three possible marks.

(g)(i) Only the more able candidates appeared to appreciate that less temperature <u>difference</u> (with respect to the outside) would result in less heat being lost.

(ii) A correct example was often provided here, with some incorrect references to 'less electricity' being required, rather than 'less electrical energy'.

(h) Many candidates failed to give any benefits to the environment resulting from reduced energy use.

Question 5

(a) More able candidates mostly gained two marks here for the correct calculation, while less able candidates answers gained one mark only for writing the equation: mass x g x height change.

(b) The less able candidates were still able to gain marks here as they were allowed to carry an error forward from (a). Despite this, the calculations were still often incorrect.

(c) As with (a) and (b) the more able candidates gained both marks, while the less able ones gained none, or possible two using the error carried forward from (b).

(d) Mostly two correct examples given.

(e) Mostly two correct examples given.

(f) Mostly correct reference to a lack of water during drought conditions or adverse effects on the habitat for wildlife.

(g) Mostly incorrect answers across the range of marks, resulting from a lack of understanding that they needed to multiply (60 hours x 12p) by 1.5, rather than 1500.

Question 6

(a) Mostly correct example given.

(b) The better answers gained two marks for mentioning that a thick layer of material is better at preventing damage to the plates as it would give more time / distance to stop and hence subject the plates to a smaller force. Very seldom was any reference made to a reduction in the rate of change of momentum or acceleration. There were many references to more/thicker material absorbing more energy or force.

(c) Often two correct examples given.

(d) Many answers referred incorrectly to changing the height of the drop etc.

(e) Mostly correct understanding that the tests needed to be repeated (to get an average).

(f) Often two correct examples given.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.