



General Certificate of Education

Applied Science

8771/8773/8776/8779

SC02 Energy Transfer Systems

Report on the Examination

2007 examination - June series

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Question 1

- (a) Well answered across the range of candidates with most answers gaining three or four marks.
- (b) A good discriminating question with only the more able candidates gaining the full three marks. Many answers incorrectly referred to 'heart beat speeding up due to more nerves' or that 'nerve impulses are sent to the medulla' (with no mention that the medulla was instrumental in sending (increased) impulses to the heart). There was also some confusion about the role played by the S-A node and the A-V node.
- (c) Many answers gained two marks for correct reference to the intercostal muscles contracting / diaphragm contracting / diaphragm moving down / ribs moving up (and out). Some candidates demonstrated a lack of knowledge regarding how pressure differences were created with respect to the thoracic cavity and the atmosphere, and how this in turn influenced air intake. Many answers referred to there being less pressure in the lungs, rather than in the thoracic cavity.
- (d)(i) Mostly incorrect answers.
- (ii) Mostly correct.
- (iii) Mostly correct.
- (iv) Mostly correct.
- (e)(i) Mostly correct.
- (ii) Mostly correct.
- (f) Another good discriminating question that only tended to be answered correctly by the more able candidates.

Question 2

- (a) Most answers gained one mark for mentioning that a faulty aortic valve results in backflow of blood, though few mentioned that this backflow would be into the left ventricle. Where a second mark was given, this was usually for stating that a faulty valve will result in less blood being pumped round the body.
- (b) Mostly correct.
- (c) Most candidates mentioned that some peoples' religion /beliefs may play a role in whether or not they were prepared to receive the valve from a pig's heart. Many also made a correct reference to animal welfare issues. Few answers, however, talked about how the length of time the different valves will operate within the patient may vary. No-one mentioned the age of the patient in relation to whether or not a second operation may be necessary in the future to replace the first valve. Only one candidate discussed the potential danger of using parts from one species inside another e.g. unsuspected virus or prion transfer.

- (d) Where one mark was awarded this was usually for mentioning that there is an element of risk attached to any surgical procedure. In all cases no reference was made to the practical difficulties involved in surgical access for severely obese patients.
- (e)(i) Poorly answered generally.
- (ii) Poorly answered, with most candidates blaming the obese person for their condition and very little acknowledgment that the obesity might have arisen due to physiological conditions outside the control of the patient.

Question 3

- (a)(i) Advantage: Poorly answered with the most common correct answers being that there are no known hazards (to the patient) or that it can be used during pregnancy.
Disadvantage: Mostly incorrect answers but occasional reference to the difficulty in obtaining images of tissues on the far side (or inside) of the lungs.
 - (ii) Advantage: Mostly correct statements that this method of imaging produces a 3-D image.
Disadvantage: The most common correct answers were that this cannot be used with patients that are pregnant or that the procedure can be stressful / claustrophobic.
 - (iii) Advantage: Mostly correct mention that this method is more readily available or that it produces clear images of bones.
Disadvantage: Mostly correct mention that the major disadvantage is the potential health risk due to exposure to X-rays (of operator or patient).
- (b)(i) Mostly correct.
 - (ii) Mostly correct.
 - (iii) Mostly correct.
- (c)(i) Gamma rays given correctly by the more able candidates.
 - (ii) Only correctly answered by the more able candidates who realised that gamma rays need to be able to get out of the body.

Question 4

- (a) A good discriminating question whereby the less able candidates gained one mark for giving either the correct equation or the correct substitution, and the more able candidates gained the full two marks for a correct calculation.
- (b) Again, some answers from less able candidates gained one mark for the substitution and the answers from the more able gained the full two marks.
- (c) Reasonably good answers that correctly connected the kinetic energy of water with the production of heat.

- (d) Many correct answers, though often an error was carried forward from part (b). Where the calculation was correctly carried out this gained the full two marks.
- (e) Mostly correct.
- (f)(i) Mostly correct examples given including the fact that fossil fuels produce CO₂, contribute to global warming, or might run out.
- (ii) Many unsatisfactory answers from the less able candidates who merely stated that the sun is not always visible/out, rather than the required, more detailed, comment relating to reduced sunlight during the winter or at night.
- (iii) Mostly correct.
- (iv) Mostly incorrect references to the cost or smell of biogas.

Question 5

- (a) Mostly correct.
- (b) Mostly correct.
- (c)(i) Many answers referred, incorrectly, to the insulating properties of the material, rather than saying that air is an insulator or a poor conductor.
- (ii) Mostly correct reference to the fact that there were small air pockets or no space for convection currents to occur.
- (d) The fact that the heat exchanger had a large surface area was most commonly given, for one mark, while the ability to radiate heat was seldom mentioned.
- (e) Mostly correct.
- (f) Poorly answered across the range of candidates.

Question 6

- (a) The correct answer was often given but, in the case of the less able candidates, without the correct unit, failing to gain one mark.
- (b)(i) Mostly correct.
- (ii) Mostly one mark awarded for saying that the ship would move when hit by the water, without mentioning the direction of movement.
- (c) Candidates tended to write about the pressure of the water from the hose causing the fire-fighter to move, without saying that the momentum of water would cause an opposite force which would push the fire-fighter backwards.
Very rarely was any mention made about shoes with a good grip producing friction that would cause the fire-fighter to stop moving.

Question 7

- (a) Generally well answered with frequent reference to cotton wool having a cushioning effect and reducing force on the bottle. Many candidates also realised that more time was allowed for the bottle to stop.
- (b)(i) Mostly correct.
- (ii) Mostly correct.
- (iii) Mostly correct.

Mark Ranges and Award of Grades

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