



**General Certificate of Secondary Education
June 2011**

Human Health and Physiology 44151H

(Specification 4415)

**Unit 1: Topics in Human Health and Physiology
(Higher)**

Report on the Examination

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General Comments

There were ten questions in the paper. Of these, questions one to six (with the exception of 6(d)) were targeted at grades C and D. Questions two to five were common with the foundation paper.

Question six (d) and questions seven to ten were targeted at grades B, A and A*. This was the first examination set on the new specification. The introduction to the subject content section 3.3 on page 8 of the specification makes it clear that many of the questions will be set in the context of the work of health professionals. Many candidates, who were otherwise well prepared, failed to appreciate the nature of the work done by these professionals.

Centres are also reminded of the booklet 'Notes on the Scope of the Subject Content' <http://web.aqa.org.uk/qual/newgcse/pdf/AQA-4415-W-TRB-OGNSSC.PDF>. This booklet indicates the depth of treatment required for many of the topics in the specification. There were several instances where candidates' answers generally fell short of the required depth.

Candidates should be advised to write in black ink or black ball-point pen only as the scanning process involved in on-line marking does not pick up pale colours well. Furthermore, candidates should be advised to ensure that if their answers extend beyond the printed lines or space then they should keep these extensions away from the edges of the page as they may be removed during scanning.

Fundamental knowledge and understanding of How Science Works in the world at large, as well as in the laboratory, were tested throughout this paper. This means that candidates should be reminded that it is essential to read all of the question carefully, analyse the information provided and think about their response before writing their answer.

Question 1

- (a) Candidates were generally familiar with the structure of the eye. Most could label the lens and the pupil, but many had problems with the iris and the cornea
- (b) There were many excellent answers gaining full marks. The most common error was to ignore the phrase 'near object' in the question. Many answers were spoiled by the introduction 'X and Y contract'.
- (c)(i) Many candidates were unfamiliar with the technique of measuring pressure in the eye; the most common responses being in terms of beams of light or lasers.
- (c)(ii) Acceptable answers included diabetes, high blood pressure and glaucoma. Common errors included cataracts, retinitis and stress.
- (c)(iii) Acceptable answers fell into two groups: damage to the retina and changes to the shape of the eyeball. Many candidates answered in terms of damage to rods and cones or in terms of changes to the shape of the lens.

Question 2

- (a)(i) Most candidates had no difficulty with the calculation, but many lost a mark by rounding down the figure shown on the calculator to 37.7.
- (a)(ii) It was rare to see an incorrect answer to this question.
- (b) To gain full marks, candidates were required to answer in terms of reduced carbohydrate / fat intake and increased intake of fruit and vegetables. There were

many vague answers such as 'eat more healthily'. Many candidates ignored the word 'diet' in the question and answered in terms of exercise or lifestyle.

- (c) Most candidates knew anorexia, but relatively few could spell the word correctly. There were many unacceptable answers in terms of vitamin or mineral deficiencies in spite of the fact that the only data given was in terms of body mass index.
- (d)(i) Centres should note that in this type of question, candidates are assessed on the quality of their written communication as well as their scientific knowledge and understanding. Although there were many excellent answers, candidates should not use phrases such as 'fats clog up blood vessels' if they wish to gain full credit. It is also important to express ideas in a logical sequence.
- (d)(ii) Although most candidates gave acceptable answers in terms of exercise, many referred to massage or to drug treatment.

Question 3

- (a) Although the question asked for two conclusions, many candidates simply described the data. Most candidates recognised that lung cancer was more common in men, but many candidates failed to give acceptable conclusions in terms of age.
- (b) Acceptable answers included reference to budgeting, staff requirements or equipment requirements. Many answers simply repeated the question, being in terms of number of patients or statistics.
- (c)(i) Most candidates gave acceptable answers in terms of the various methods of scanning, but a surprising number answered in terms of 'screening' or 'breathing tests'.
- (c)(ii) Lack of knowledge of the precise roles of health professionals was exemplified by the large number of candidates who answered with 'doctors' or 'nurses'.
- (d) Most candidates gave acceptable answers in terms of chemotherapy, radiotherapy or surgery, but a surprising number gave 'lung transplant'.

Question 4

- (a) It was pleasing to note that most candidates were familiar with the technique. However, many ignored the instruction 'how acupuncture is carried out' and answered in terms of effects eg 'to restore harmony'.
- (b)(i) Most candidates recognised at least one control variable, but there were many vague answers eg 'number of patients'. Some candidates confused 'control variable' with 'control group'.
- (b)(ii) Most candidates answered correctly in terms of the Y axis label from the graph, but many gave 'time', which was too vague.
- (c) Acceptable answers included 'placebo effect' or reference to a 'psychological' effect. Many candidates stated that the 'control treatment was successful'.
- (d) Relatively few candidates answered in terms of some patients not responding to treatment or in terms of anomalous results. A majority of candidates were content with 'more reliable', 'more accurate' or 'more valid'. Others merely re-stated the question 'a mean is just an average'.

- (e) A majority of candidates correctly stated that the advice should be to try the treatment since it was successful with many patients. A surprising number of candidates stated that the control treatment should be recommended.

Question 5

- (a) Although the question made it clear that candidates should answer in terms of the prevention of entry of the virus, many candidates answered in terms of white blood cells. Acceptable answers included the presence of acid or mucus in the vagina or cervix.
- (b)(i) Candidates were required to answer in terms of uncontrolled cell growth to gain credit. Many answers referred vaguely to growth.
- (b)(ii) Most candidates answered correctly in terms of the spread to other organs via the blood or the lymphatic system. However, many limited their answers to the effect of the primary cancer on the organ where it was situated.
- (c)(i) Most candidates correctly described the rise and fall in the number of new cases, but many were not sufficiently precise in their descriptions of the peak age range.
- (c)(ii) The two Y axis scales confused the majority of candidates, relatively few reading 12.5 new cases per 100 000 population for the 25-29 age group. Most candidates did, however, gain one mark for realising that they should multiply their graph reading by five.
- (c)(iii) Most candidates gained at least one mark for recognising that most girls of this age would be uninfected with the virus, or would not be sexually active. However many then went on to give more general answers in terms of protection rather than being specific about the greater chance of success by vaccinating at this age.
- (d) Answers in terms of side effects were common, but relatively few gained a second mark for answers in terms of sexual activity.

Question 6

- (a) The majority of candidates recognised both structures, but some candidates gave bronchi or bronchioles rather than alveoli.
- (b) There were many excellent answers gaining full marks. Most candidates described the movement of the diaphragm correctly, but many candidates found difficulty in describing the effect of contraction of intercostal muscles on the movement of the rib cage. Cause and effect were often confused eg 'contraction of X causes the diaphragm to go down'.
- (c)(i) Candidates gave a wide range of checks that could be made, but did not receive credit unless checking the airways for obstruction was included in the list.
- (c)(ii) Most candidates recognised that it was essential to get oxygen into the body, but many did not specify the particular need to get oxygen to the brain. There were some excellent alternative answers in terms of carbon dioxide from the paramedic's breath stimulating breathing
- (d)(i) Most candidates ignored the fact that the mixture contained 92% oxygen and answered in terms of getting more oxygen into the lungs. It was surprising that many candidates who answered part (c) in terms of carbon dioxide in the paramedic's breath did not realise that the same answer here would have gained credit.

- (d)(ii) Only the very best candidates realised that there was no carbon dioxide in mixture Z and therefore there would be no / little stimulation of pH or carbon dioxide receptors.

Question 7

- (a)(i) Many candidates ignored the word 'how' in the question and were content to merely describe the two sets of data. Better candidates answered in terms of rise in blood glucose stimulating insulin production and the subsequent effects of insulin on the liver and body cells. It was worrying to see the number of candidates who think that the brain / hypothalamus control blood glucose levels.
- (a)(ii) As in part (a)(i), many candidates described trends in concentrations rather than giving an explanation in terms of cause and effect.
- (b) Most candidates gained at least one mark for stating that the pump allowed the patient to adjust her insulin level, but relatively few went on to expand their answers in terms of activity and diet.

Question 8

- (a)(i) It was disappointing to see that most candidates merely stated that 'bones would become weaker'. Better candidates referred to the role of vitamin D in calcium absorption. It was comparatively rare for candidates to refer to calcium as a structural component of bone.
- (a)(ii) Most candidates correctly referred to either reduced oxygen uptake or to breathlessness and better candidates usually referred to both.
- (a)(iii) Perhaps a majority of candidates answered in terms of insulin rather than digestive enzymes. Those who did answer in terms of enzymes were frequently confused as to the site of the digestion performed by pancreatic enzymes, many citing the stomach. It was disappointing to see that many candidates answered in terms of bile.
- (b) There were very few creditworthy answers to this question. Most candidates seemed to be unaware of the HT statement in section 3.3.10 'Genetic information' of the specification.
- (c) Many candidates produced correct punnett squares involving heterozygous parents, but relatively few stated that if one child has cystic fibrosis, both parents must have at least one cystic fibrosis allele. Many candidates attempted diagrams in terms of a sex linked allele, but received no marks since no allele was shown on the Y chromosome. Candidates who gave diagrams involving eight crossing lines frequently included errors in these diagrams.
- (d)(i) Most candidates correctly referred to the risk of damage to or death of the embryo. Many then went on to state ethical / moral / religious reasons. Weaker candidates gained no credit for statements such as 'it's wrong to play God' or 'It's interfering with nature'.
- (d)(ii) Most candidates realised that one of the parents would not be a biological parent, but many failed to complete the answer by giving a consequence of this fact.
- (e) It was very rare to see a full mark response. The vast majority of candidates seemed to be unaware of the information in 'Notes on the Scope of the Subject Content' about the use of viruses by genetic engineers. Many candidates gave descriptions of

insulin production. Even more gave answers in terms of direct transfer of genes into lung cells.

Question 9

- (a)(i) Most candidates correctly gave 'pacemaker', but many answered in terms of atria, ventricles or valves.
- (a)(ii) The vast majority correctly gave 'pacemaker'. Stopping, then restarting the heart was accepted, but references to drug treatment were ignored.
- (b) It was pleasing to note that many candidates were aware of the stem cell research, but many other candidates answered in terms of transplants or artificial hearts.
- (c)(i) It was disappointing to note that many candidates gave only a cursory glance at the information. These candidates normally received just one mark for reference to the motors or to the power supply. Only the better candidates answered in terms of the number of chambers and the use of hydraulics to move the blood rather than muscular contraction.
- (c)(ii) In this question candidates were assessed on the quality of written communication as well as their scientific understanding. To gain full marks the answer should follow the sequence advantages, disadvantages, and conclusion. The answer should also contain the appropriate use of specialist terms. Better candidates gave answers including references to availability, rejection, immunosuppressants and references to risks of power failure and mechanical failure. Weaker candidates frequently referred to the weaknesses of previous versions of artificial hearts.

Question 10

- (a)(i) The majority of candidates correctly referred to antibodies in maternal milk. Most went on to describe nutritional benefits but these answers were often on the lines of 'contains good / healthy nutrients'
- (a)(ii) The majority of candidates referred to bonding and cost, although many stated that breast milk was cheaper (rather than free). There were many correct references to time saving, reduction of breast cancer risk and helping the uterus to return more quickly to its pre-pregnancy size. Unacceptable answers included 'helps to get the figure back' and 'helps to expel the placenta'.
- (b) The precise functions of the functions of reproductive hormones are given on page 21 of the specification. Candidates should be aware that 'maturation' is not the same as 'growth' or 'production'. There were many references to the uterus rather than its lining.
- (c) Most candidates seemed unaware that hormones produced by the placenta during pregnancy inhibit FSH production.
- (d) The majority of candidates realised that the taking of a large number of readings by the device increases its reliability.
- (e) Only the best candidates noted the correlation between temperature and LH production and then went on to link LH production with ovulation. Most candidates ignored LH and directly linked temperature rise with egg release.

- (f) Most candidates realised that a device designed to predict egg release would be unreliable in terms of contraception. Relatively few, however, clearly stated that intercourse on days just before or just after egg release could result in pregnancy.

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