

**Additional Applied Science A
Twenty First Century**

General Certificate of Secondary Education J632

Report on the Components

June 2008

J632/MS/R/08

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Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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A324/01 – Additional Applied Science A – Life Care – Foundation Tier

General comments

The paper was suitably challenging and no candidates appear to have been disadvantaged by language or cultural issues. A small number of candidates scored nearly full marks and almost everyone was able to find something that they could answer. Very few sections were unanswered suggesting that the paper was accessible and candidates were not under pressure of time.

Comments on individual questions

- Q1 Part (a) and part (b) were generally very well answered leading to high marks for most candidates.
In part (c) (i) the majority of candidates identified tobacco and alcohol use as being important but a few were distracted by food preferences instead of family medical history. Part (c) (ii) proved to be quite challenging. Weak candidates interpreted the question as an opportunity to explain how Mandi could lose weight or become fitter and most offered no way to **test** her fitness. Descriptions of a suitable aerobic exercise were rarely combined with some form of measurement (e.g. recovery time for pulse rate).
Most candidates did not appreciate that the purpose of making records in part (d) could be to facilitate sharing of information over time by the team of professionals who are monitoring the health of the employee. Despite a related question in January, it is clear that many candidates have not understood the point of medical/fitness records, diagnosis of present or future illness being common blind alleys in this case.
- Q2 Part (a) was often done quite well with most candidates scoring at least one mark, although some felt that looking after Marcus' luggage was important – and others wanted to “keep him awake” – although it was clearly stated that he was unconscious. Clearly candidates need to read questions carefully before attempting to answer them. Those who understood that the friend could communicate information about Marcus did not always give medically related examples.
In part (b) the way patients are prioritised was well understood by most candidates, although the weaker ones lost marks by simply restating the question stem or not giving enough detail to be clear.
The procedure for taking a blood sample in part (c) was generally well known and very few candidates gave absurd sequences. “One other sample” required in part (d) was usually correctly answered although weak candidates often described measurements (temperature, blood pressure etc.) rather than urine or tissue samples. A few candidates used slang terms although scientific words are mentioned explicitly in the specification.
- Q3 Despite the appearance of a similar question in January, the process of rehabilitation and the role of the physiotherapist were not well known. Many candidates in part (a) were expecting Imran to undertake vigorous aerobic exercise to start his recovery and very few offered any form of progression from one non-impact type of exercise to something more challenging as the muscle healed.
In part (b), many candidates achieved a mark for the idea that the physiotherapist needed to see how the injury responded to exercise, but many assumed that this was to help the physiotherapist develop a better understanding or to advise Imran “next time” rather than to adjust the programme as necessary.

Q4 Labelling of the parts in the reproductive system in part (a) was occasionally perfect, but many candidates could only recognise the umbilical cord with certainty. A number of candidates used the words vagina, cervix and ovary, so this area is not well known by weaker candidates.

In part (b), the main errors involved a focus on the foetus rather than the mother's body and often traced its development through three trimesters. A worrying number of candidates think that the mother's **stomach** grows larger and this was usually accompanied by some quite casual use of non-scientific terms to describe body parts. Although they may be common parlance, it is to be hoped that candidates should be able to avoid the more earthy slang terms in describing such an important process.

Most candidates understood that meetings with the midwife in part (c) were to check on the progress of both mother and baby – although some seemed to think that the midwife was only involved during delivery.

Although part (d) seemed to be a simple exercise in reading off the graph, a remarkable number of candidates failed to get near the right answer, with answers as high as 150 weeks.

Candidates answering part (e) often obtained a mark for the catch-all answer of making Fiona less nervous about the procedure – and weak answers often involved “making sure that there was **no risk** to the baby”. However, the concept of explaining and assessing the inevitable risks, together with giving consent were rarely well explained.

A324/02 – Additional Applied Science A – Life Care – Higher Tier

General comments

The overall performance of the candidates was good although there are still a significant number of candidates for whom the Foundation paper would be more accessible. There was no evidence of any candidates having insufficient time to complete the paper. Generally speaking, the candidates had been well prepared for the examination and were able to demonstrate a good understanding of health care provision, with the more able individuals showing good data handling and comprehension skills. However, a considerable number lost marks through failing to read the questions carefully enough. It would be helpful if schools emphasised the importance of clear handwriting and following the guidance about writing within the framework of the paper.

Comments on individual questions

Q1 Question 1 was an overlap question with the Foundation paper. Part (a) was an accessible start to the paper and many candidates scored full marks here.

In part (b) specific physical changes to the body due to pregnancy were credited rather than the effects of those changes. Candidates need to be aware of being anatomically correct when describing changes – there were many (incorrect) stomachs swelling.

Parts (c), (d) and (e) were well answered but candidates need to ensure that they need 2 distinct points to gain 2 marks where a 2 mark answer is indicated.

Q2 In (a) (i) candidates were asked for **two other** baseline assessments – and this is an example of many candidates not reading the question carefully enough – many either giving 1 example or quoting the factors used to calculate BMI which was used in the stem of the question. Using questionnaires was not an acceptable alternative to baseline assessment.

Candidates showed good mathematical skills in (a) (ii) with very few errors and most correctly identified the correct position of X in (a) (iii).

In (b) candidates correctly identified a suitable type of scan but few realised that the main advantage was to do with the non-invasive aspect of the technique and advantages linked to this.

Part (c) was not well answered – many candidates were not specific in their answers and gave one very general answer even though 2 marks were indicated. Good candidates realised the need to build up a training programme so as not to incur further damage.

Q3 Again in question 3 candidates needed to read the question carefully and think before putting pen to paper – they are given the lead in of blood and urine samples being taken and then asked for 2 further samples – there were a significant number of blood pressures and temperatures quoted. Faeces (in its many phonetic forms) was a common correct answer but candidates do seem somewhat shy of using correct biological names – manure and other less biological terms being seen in a significant number of answers!

Part (b) was very disappointing – few candidates knew two correct functions of the kidney – cleaning blood being a common general answer.

Part (b) (ii) was a good high level discriminator - many candidates scored one mark by correctly identifying the cost implications of having centres of expertise, more able candidates gained a second mark but only a few top candidates were able to gain 3 marks here with a full, detailed answer.

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- Q4 In (a) the question is asking why does the consultant assess the risks to Kelly – candidates misunderstood the use of the term ‘assess’ and failed to realise that the question was about whether the risks of the procedure outweighed the benefits and not informing Kelly about the procedures.
In part (b) answers tended to be centre specific – some centres do not appear to have included drug therapy in their programme and their candidates left this question blank. In centres where this had been taught most candidates gained at least one mark - usually for chemotherapy (often seen as kemo!) and more able candidates gained a second mark by describing the therapy.
Part (c) was well answered with many candidates scoring at least 2 of the 3 marks.
- Q5 Question 5 was intended to be a high level discriminator and it worked well in this respect. Only the most able candidates were able to discuss the best use of a very expensive drug in a limited budget situation.

A325/01 – Additional Applied Science A – Scientific Detection – Foundation Tier

General comments

This was the second time that this paper had been sat by post pilot candidates and it was pleasing to see how well the vast majority of candidates had been prepared for the examination. Most candidates followed the instructions and answered the questions in the correct manner. However when an alternative method of answering was provided, credit was given if the examiner was sure that the candidate knew the correct response.

Comments on individual questions

- Q1 In part (a) most candidates managed to score two marks. However all too often candidates did not make it clear which of the two diagrams they were referring to. This meant that credit was not given. Good answers referred to A having wings, A having six legs but B having eight, and A having larger back legs or antennae. In part (b) any answer between 2.2 and 3 was accepted for A. A common error was that candidates used the scale as the actual size of the organism. Overall candidates were not good at converting scales into actual sizes and would benefit from practice of this skill. Part (c) should have been an easy question, but a large proportion of candidates failed to read the question properly and gave two more important differences between A and B often repeating what they had written in part (a). Good answers included a written description, chart or table, photograph or video of the organisms.
- Q2 This proved to be an easy question with the vast majority of candidates scoring full marks. Where errors did occur it was usually by giving 'danger' as the incorrect response for 2 down. Incorrect spelling was not penalised in this question.
- Q3 Those candidates who followed the instructions and used the statements to answer the questions did much better than those who failed to follow the instructions and made up their own statements. As usual with errors of this type, credit was given for a correct response but candidates gamble heavily when not using the information provided. Part (a) (i) discriminated well with approximately half the candidates giving the correct response of 'to get a closer match'. Part (a) (ii) also discriminated well with approximately half the candidates giving the correct response of 'to mix the solutions'. Common errors included 'not contaminating other tubes'. Part (a) (iii) proved more testing and a common error was to give the answer to part (a) (i). Part (a) (iv) discriminated well with approximately half the candidates giving the correct response. The vast majority of candidates scored the mark for part (b) (i) using the word 'accurate' correctly. Candidates who used two or more words from the list were not credited. Approximately half the candidates were credited for part (b) (ii) but it was not always the more able who scored the mark. This suggests that not all students had been taught this part of the specification. This was an overlap question with the higher tier paper and some candidates found it to be a testing question.
- Q4 In part (a) only the most able candidates scored any marks. It was clear that most candidates did not understand the way in which chromatography worked, where the solvent front was and which the mobile and stationary phases were. Part (b) proved harder still and many candidates responded by not answering the question. In situations such as this, candidates would be well advised to guess in order to have

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some chance of gaining a mark. Part (c) proved to be more accessible but many candidates only gave a one mark answer. Candidates would be well advised to look and see how many marks are on offer and construct an answer accordingly. Good answers referred to X and Y behaving differently so they must both be different substances.

- Q5 Part (a) was a straight forward labelling exercise and should have been three easy marks. However weaker candidates failed to score all three marks by making simple errors, commonly labelling the clips as the stage and the turret as the objective lens. Again, in part (b) only the most able candidates scored full marks on this question. The most common error was to link the 'stage' to 'stops the slide moving'. Candidates need to be advised to stop and think before answering questions of this type.
- Q6 During the pilot, candidates struggled with questions on this area of the specification. However most candidates managed to score at least two marks in part (a). It was clear that most candidates had been well prepared on this part of the specification. Part (b) was not answered so well. Many candidates were confused in thinking that finger prints were discovered using DNA profiling obviously being confused by the term 'DNA finger print'. More time needs to be spent with candidates on this area of the specification. Good answers included reference to paternity testing, pedigree testing, food testing for unwanted ingredients, and identifying criminals and victims at a crime scene. Credit was not given if candidates simply stated to 'find' a criminal rather than 'identify' a criminal.

A325/02 – Additional Applied Science A – Scientific Detection – Higher Tier

General comments

Although this examination was relatively short, there was no evidence that candidates were short of time. Most candidates were able to make some response to all questions.

Comments on individual questions

- Q1 Part (a) (i) caused no problems for the majority. Some candidates lost out because they could not correctly multiply the 2 numbers – it was a pity they did not have a calculator. Some did not know whether to multiply or add and wrote down correct answers to both sums before picking and writing their choice in the answer space. Only a very small number scored both marks in part (a) (ii), most candidates misinterpreted the question. Comments about evidence being found outside the cordoned off area were given on a number of occasions rather than the accuracy of the measurement being commented on. In part (b) (i) few candidates successfully read the Vernier scale; many errors appeared e.g. 1.68, 0.89, 8.8. In part (b) (ii), most candidates score 2 marks with BECA being a popular choice – presumably arrived at by using skills of English and common sense.
- Q2 In part (a) candidates who made use of the statements given were generally more successful than those who used their own words. There was some confusion between the explanation for using several concentrations and why the method would still not be accurate. A significant number thought that step 4 was done to avoid contamination by the pipette rather than to mix the solution properly. In part (iv) answers based on ‘accuracy’ or ‘fair tests’ appeared regularly when candidates used their own words. Part (b) (i) was well answered, with most candidates realising that the colorimeter gave greater accuracy. The most able candidates wrote very good clear sentences here. Candidates struggled much more in part (b) (ii); ‘qualitative’ appeared almost as often as the correct ‘quantitative’, with a fair number of ‘semi-quantitative’ too.
- Q3 Most candidates were able to correctly solve 3 or 4 of the clues, they found ‘proficiency’ the most difficult, with ‘safety’ and ‘reliable’ the most common scoring answers. The use of the grid did not help those candidates with poor spelling skills, ‘accommodation’ was often squeezed into the spaces for ‘accreditation’ and there were many variations on the spelling of ‘proficiency’.
- Q4 The diagrams of chromatography were very poorly understood. In part (a), candidates seemed to be confused by the side view of the chromatogram. Labels for the mobile and stationary phases were usually pointing clearly at the solute spots. In part (b), very few candidates were able to draw in the horizontal arrow to indicate movement of the solute between the phases. Most arrows went up or down, appearing outside the diagram, in the stationary phase or in the mobile phase. Most candidates were able to score at least 1 mark in part (c). Some candidates lost out because although they gave a full description for the second mark – which could have scored twice - they failed to say that X and Y were different. A few said that the solutions had different concentrations or that the colours would be darker or different.

- Q5 Candidates found part (a) surprisingly difficult with very few scoring all 3 marks. The continuous phase and paper strip were often chosen. Better, but incorrect, answers placed the filter after the test solution and light sensitive cell.
- In part (b) candidates did not have a good understanding of the use of pure water in the colorimeter. A lot of candidates based their answers on the idea that water 'cleaned' the colorimeter. Very few mentioned the zero setting although a few scored for accuracy. Some otherwise high scoring candidates just missed the mark by talking about calibrating the machine – but missing the significance of water being zero.
- In part (c) most candidates were able to score something on the graph.
- In part (i), weaker candidates used non-linear scales but most candidates who correctly put the scales on the graph then plotted the points correctly. Lines were surprisingly varied, from non-existent, to freehand, multiple, and lines drawn from one point to the next rather than the best straight line. With one mark for a straight line drawn with a ruler, through the candidates own plotted points (and therefore not having to pass through 0) it was surprising that some candidates scored the first 2 and missed this one.
- Despite being told to draw lines on the graph in part (ii), many candidates did not. Some lines were not horizontal – varying by a whole graph square. Most candidates realised that they should use 0.24 on the vertical axis and read off the value on the horizontal axis. Some had made life difficult for themselves by choosing a scale of 10 small squares = 0.15 – but some of these still correctly read off the value. Some read off a value of 0.32 as 0.3.
- Candidates found part (d) surprisingly difficult, with many joining colorimeters to concentration and solution to intensity instead of vice versa, so losing 2 marks. Again many thought colorimeters provided qualitative data.

A326/01 – Additional Applied Science A – Communications – Foundation Tier

General comments

This session would have been the first for the majority of centres entering candidates for this module. It was good to see that most candidates had been entered for the correct tier, with few earning very few or very high marks.

The specification of this module requires candidates to learn some facts and vocabulary which they would not have come across in the rest of their science course. It was clear that most candidates did not know the range of frequencies used for broadcasting on medium wave or what passes through optical fibres, suggesting that centres have not spent much time imparting factual knowledge. Similarly, many candidates confused encryption with compression. Centres can only give their candidates an advantage if they emphasise facts and the meaning of technical terms.

The requirement for candidates to research their own examples of a variety of communication systems is a particular requirement of the specification. It was clear from their responses to 2(b) that many candidates had not done this to the depth required - many were clearly misinterpreting the word 'link'. Centres should ensure that adequate time is set aside for candidates to build up a portfolio of each example required by the specification, rather than assuming that it will happen automatically as they proceed through the course.

Comments on individual questions

- Q1 Part (a) tested each candidate's understanding of the function of the blocks in a radio transmitter. Most knew what an amplifier and a microphone did, but only a minority realised that the aerial was a source of radio waves, and not the modulator.
For part (b), candidates seemingly chose at random.
Although in (c) the vast majority of candidates recognised the hazard symbol, many suggested inappropriate safety precautions - including drying hands and wearing safety goggles.
Part (d) required candidates to calculate the amplitude and frequency of a signal from an oscilloscope trace. They seemingly chose the amplitude at random from the three values offered, but the vast majority knew the sequence of operations required to find the frequency.
- Q2 This question was about the use of optical fibre and copper wire as links for communication systems. Surprisingly, very few candidates knew that optical fibres carried infrared light. Too many weak candidates discussed the security aspects of optical fibre instead of other reasons why it is used for the internet.
For part (b) many candidates lost the mark by describing a system (such as a mobile phone) where copper wire formed only part of the link. Furthermore, only a minority could give sensible reasons why copper wire was used as the link - most concentrated on the good electrical properties of copper, instead of comparing it with alternative links (such as radio waves or optical fibre).
- Q3 It was good to find that many candidates realised that the scanner came first and the printer came last in the block diagram for a fax machine. Even if they entered the blocks incorrectly, the vast majority of candidates entered the encoder before the decoder, showing a good grasp of vocabulary.

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In part (b), many weak candidates confused encryption with compression, and lost marks accordingly.

However, for part (c), most candidates could suggest a device which stores digital information. Candidates were not penalised for suggesting a mobile phone or ipod, but otherwise lost the mark if the digital storage aspect of the device was only peripheral to its function - such as a television or a computer. Weak candidates failed to read the question carefully and lost a mark by suggesting the use of a hard drive.

- Q4 Many candidates were able to successfully identify the LED in the circuit, but often had difficulty in suggesting two valid reasons why mains power would be better than using a battery for the circuit. Too often they stated that a mains power supply would supply more power/volts/amps than a battery - clearly not a good thing. Don't they check the voltage rating of the mains power units that they plug into their phones, ipods and laptops?
- Q5 This was the first of two questions which also appeared on the Higher Tier paper, and was therefore designed to be accessible to the minority of candidates operating at grade C. Unsurprisingly, most candidates were unable to identify the digital signal from the four oscilloscope traces - the sine wave was the most popular incorrect response! Only half of the candidates knew that digital recordings had a clearer sound (with less noise of interference), and even fewer could suggest other advantages (such as ease of transfer) of recording music digitally.
The calculations of part (b) proved too hard for many candidates, with only a small number knowing how to calculate the bits required or how to transfer their answer into bytes. Many candidates stated that they would use a computer to convert the file size from bits to bytes, suggesting confusion with compression?
- Q6 This question was well answered by many candidates. Some wanted to place the satellite before the transmitter, but the vast majority placed the cameras and microphones at the input.
Weak candidates lost marks in (b) by not providing enough detail about what the people in the editing suite did with the information passing through, e.g. cutting out bad language, selecting pictures and sounds, trimming to fit the time slot ... simply listing their job title earned nothing.

A326/02 – Additional Applied Science A – Communications – Higher Tier

General comments

For the majority of centres, this would have been the first time that they have entered candidates for this paper. It was disappointing to find that at least half of the candidates could have been entered for the Foundation Tier without making any difference to their final grade. As it was, they were faced with an exam where the majority of the questions were too hard for them. They could have earned the same grade on Foundation Tier, and had a much more satisfying exam experience as well.

The specification of this module requires candidates to learn some facts and vocabulary which they would not have come across in the rest of their science course. It was clear that most candidates did not know the range of frequencies used for broadcasting on medium wave or what passes through optical fibre, suggesting that centres have not spent much time imparting factual knowledge. Similarly, many candidates confused encryption with compression. Centres can only give their candidates an advantage if they emphasise facts and the meaning of technical terms.

The requirement for candidates to research their own examples of a variety of communication systems is a particular requirement of the specification. Centres should ensure that adequate time is set aside for candidates to build up a portfolio of each example required by the specification, rather than assuming that it will happen automatically as they proceed through the course. In particular, they need to know, in detail, how each block of their system alters the signals which pass through it.

Comments on individual questions

- Q1 This question also appeared on the Foundation Tier paper, so it should have been a relatively easy start for all candidates entered for this paper. However, many candidates could not identify the digital signal, suggesting that they had not met oscilloscope traces as part of their course. Similarly, many were unable to state the advantages of using digital signals to record music (no background noise, ease of transfer ...). The calculations required for part (b) were more successfully done, although only the strongest candidates knew that there were eight bits in a byte.
- Q2 The candidates' responses to (a) suggested strongly that most candidates had never calculated the frequency of a signal from its oscilloscope trace. Only a handful of correct responses were noted for the frequency, although strong candidates were able to calculate the amplitude correctly. Most candidates offered the period of the signal as its frequency. In part (b), all candidates failed to provide enough detail for the function of the amplifier and the aerial. At Higher Tier level, they are supposed to explain the function of a block by describing what it does to the signals passing through it, i.e. increasing the amplitude of the signal at the input, converting electrical signals into radio waves. Too often, candidates offered vague statements (such as 'transmits the signal') which didn't earn the mark. Weak candidates often forgot the context and discussed the function of an aerial as a receiver rather than as a transmitter.
- Q3 It is expected that candidates entered for the Higher Tier paper have a good grasp of electrical circuit theory. So it was disappointing to find that many candidates were unable

to state in part (a) (i) that, if the battery provided 6V and the LED used 2V then there had to be 4V left for the resistor.

Candidates fared better with the calculation of part (a) (ii), often losing one mark by using the wrong voltage to calculate the current.

In part (b), most candidates earned no marks at all. Most of them stated that the switch needed a higher current as it got lost in the resistor before it reached the LED, and ignored the presence of the integrated circuit completely.

Q4 It has always been the case with these papers that candidates have a lot of difficulty in completing block diagrams if they are not supplied with a list of words. The fax machine is one of many systems listed in the specification which candidates are supposed to know about, so it was very disappointing to find that 'scanner' and 'printer' were not being written in the first and last boxes. Candidates clearly did not realise that the encoder had to reside within the first fax machine, so 'first fax machine' was an inappropriate entry for the input box.

In part (b) most candidates provided answers that were too vague, lacking enough detail to show that they applied to the input block and encoder of a fax machine. Few mentioned that the input block had to transfer information from a printed page into electrical form or that the encoder used this information to produce a digital signal of infrared light to pass along the link.

Q5 It was good to find that the majority of candidates could explain the advantages of encrypting and compressing information, but disappointing that the vast majority had no idea why the use of programmable components considerably lowers the cost of electronic systems. Too many candidates assumed that, without programmability, a human being would have to sit inside the machine and dispense the cash by hand.

Q6 This question, the second one which also appeared on the Foundation Tier paper, was well answered by many candidates. Some wanted to place the satellite before the transmitter, but the vast majority placed the cameras and microphones at the input.

Weak candidates lost marks in (b) by not providing enough detail about what the people in the editing suite did with the information passing through, e.g. cutting out bad language, selecting pictures and sounds, trimming to fit the time slot ... simply listing their job title earned nothing. The vast majority of candidates finished well by correctly identifying the type of aerial for the receiver.

A334/01 – Additional Applied Science A – Agriculture & Food – Foundation Tier

General comments

This is the second time this specification has been offered to all schools. The specification is based on Products from Organisms from the Pilot Science E which was examined seven times. The entries increased from 2200 in January 2008 to 7056. The overall performance of the candidates was quite good, at least matching previous performances in the Pilot.

For many candidates a better examination technique would have led to a significant improvement in their grade. Common errors included failure to read the question carefully enough, for example:

- in Question 2(a) requiring *useful* characteristics
- confusing advantages and disadvantages in Question 3(d) and 5(b) (i).
- in Question 5(b) (ii), simply rewriting the question instead of answering it.

Scripts are now scanned and marked on line. Teachers should remind their students to:

- read the question thoroughly and consider their answer instead of writing down the first piece of information they think about.
- restrict their answers to the allocated spaces and not write in the margins.
- remember that quality is more important than quantity.

Comments on individual questions:

- Q1 This question was based on gathered and whole organism harvests.
In part (a) the majority of candidates were able to correctly identify the examples of the different types of harvest.
In part (b) the majority of candidates correctly named one other product from cows.
- Q2 This question was based on selective breeding and artificial insemination in cows.
Since only about 20% of candidates answered part (a) (i) correctly, there was clearly some confusion. Candidates were asked to write down a useful characteristic a cow must have to take part in a selective breeding programme to improve milk yields. The obvious correct answer was to have a high milk yield. The majority of answers were not related to the question.
As in (a) (i) most answers (90%) to part (a) (ii) were not related to the question.
In part (b) (i) candidates were required to describe the process of artificial insemination using information in the diagram to help them. This question was quite well answered. Poor answers simply described the diagram without reference to sperm.
It was surprising to note that about 60% of candidates were unable to write down an acceptable advantage of artificial insemination in part (b) (ii).
- Q3 This question was based on growing tomato plants.
In part (a) the majority of candidates were able to do the simple calculation about extending the growing season.
In part (b) only about 10% of candidates suggested weighing the strawberry crop to measure crop yield. Common impractical answers were to count them or measure them with a ruler.

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Part (c) (i) was generally well answered. Some candidates clearly did not understand the question and suggested pests and “bugs”.

In part (c) (ii) it was pleasing to note that the word equation for photosynthesis was well known.

In part (c) (iii) most candidates scored at least one mark by correctly identifying other conditions necessary for a good strawberry crop. Vague answers such as “soil” were not accepted.

In part (d) candidates were required to name two disadvantages of using polytunnels. There was some confusion with some candidates naming advantages. Only about 20% of candidates managed to score any marks; most had obviously not considered the disadvantages of this system.

Q4 This question was based on composting and sustainable agriculture.

In part (a) it was disappointing to note that only 50% of candidates were able to name a type of micro-organism.

In part (b) candidates were required to complete the sentences about the production of compost. A common error was to identify the process as anaerobic respiration despite oxygen being in the equation.

Part (c) was about sustainable agriculture. It was pleasing to note that, despite this being a difficult topic, it was generally well answered.

Q5 This question was based on egg production. It was also on the Higher Tier paper and was targeted at Grades D/C.

In part (a) almost all candidates were able to correctly identify the segments of the pie chart.

Part (b) (i) produced a good spread of marks. Answers not receiving credit confused advantages and disadvantages or wrote vague rambling answers or did not refer to ideas about animal welfare.

In part (b) (ii) many candidates had difficulty in writing a clear answer as to why Mannie’s eggs cost more. Despite a wide range of acceptable answers, few candidates scored two marks.

In part (c) many strange answers were received to explain what the lion mark indicated, despite this question being asked on the January 2008 examination.

In part (d) only about 15% of candidates knew the function of the Egg Marketing Board. Most candidates believed that the board supplied money or land to farmers rather than advice, promotion and research.

A334/02 – Additional Applied Science A – Agriculture & Food – Higher Tier

General comments

This is the second time this specification has been offered to all schools. The specification is based on Products from Organisms from the Pilot Science E. This pilot specification was examined seven times. The entries increased from 759 in January 2008 to 1955 in this new specification. The overall performance of the candidates showed reasonable targeting by staff. However, it was apparent that the examination was not a very pleasant experience for a number of candidates who obviously had not expected questions on Higher Tier topics such as genetic modification.

As in Foundation Tier, for many candidates a better examination technique would have led to a significant improvement in their final grade. Common errors included failure to carefully read the question, resulting in:

- writing disadvantages instead of advantages in question 1 (b) (i)
- writing answers not directly related to the question, e.g. 2 (a) (i)
- writing a very brief answer instead of a detailed answer when more than one mark was available, e.g. 3 (b)

Scripts are now scanned and marked on line. Teachers should remind their students to restrict their answers to the allocated spaces and not write in the margins.

Comments on individual questions:

Q1 This question was based on free range egg farming. It was also on the Foundation Tier paper.

In part (a) almost all candidates correctly identified the segments of the pie chart.

In part (b) (i) most candidates scored at least two marks in describing the advantages and disadvantages of free range farming. Common errors included confusing advantages and disadvantages and not targeting their answer towards animal welfare.

In part (b) (ii) most candidates scored one mark in explaining why Mannie's eggs were more expensive, but very few scored the second mark.

In part (c), as in the Foundation Tier, some strange answers were written to explain what was indicated by the Lion Quality mark

In part (d) very few candidates realised that the Egg Marketing Board supported farmers by promotion, advice and research. Most believed that they provided money and land.

Q2 This question was based on cheese making and genetic engineering. Very few candidates scored any marks.

In part (a) (i) candidates were asked why sterilised milk was used. Many candidates were not specific in their answers or had misunderstood the question, writing "to kill bacteria" instead of "it does not contain bacteria".

In part (a) (ii) there was much confusion over the pH scale. Many candidates wrote contradictory answers such as "it rises and becomes acidic" or "it falls and becomes alkaline".

In part (a) (iii) many candidates wrote low level and unacceptable answers such as "to dry it" or "to make it solid". Candidates had not understood the question which asked them to explain how removing water would preserve (which was in bold type) the cheese. Answers referring to preventing bacterial growth were expected.

Part (b) required a basic understanding of genetic engineering and candidates were directed to answer three bullet points. Since 80% of candidates failed to score any marks it was obvious that very few candidates had any relevant knowledge.

The lack of understanding about genetic modification was again obvious in part (c) with answers trying to explain why the yeast did not need GM labelling and 90% of candidates scoring zero.

Part (d) was about supply and demand and it proved to be the only part of question 2 in which some candidates scored a mark. However a common mistake was to believe that the more the demand the cheaper it would be.

Q3 This question was based on growing strawberries.

In part (a) the majority of candidates correctly calculated the strawberry crop yield when using polytunnels.

In part (b) most candidates realised that the higher the rate of photosynthesis, the more strawberries would be produced and scored one mark. Few candidates included references to photosynthesis producing food enabling the plants to grow more.

In part (c) (i) most candidates realised that the higher the light intensity, the faster the photosynthetic rate and scored one mark. However there was a common confusion over temperature, resulting in few candidates correctly describing the plateau at high light intensities.

In part (c) (ii) most candidates realised that the curve would start to the left of the original but few realised that it would also plateau at a higher level.

In part (d) naming another limiting factor caused few problems. A common error was to repeat "temperature" instead of naming another factor.

Q4 This question was based on timing the control of reproduction in cows and artificial insemination.

Part (a) required candidates to describe how chemicals controlled the timing of reproduction and three bullet points were listed to help the candidates. As with genetic modification, this topic exposed the candidates' lack of knowledge.

In part (b) most candidates simply repeated the question and referred to timing of reproduction instead of timing of birth or fertilisation and relevant advantages such as avoiding bad weather, advance booking of a vet, timing to fit into markets and high demand.

In part (c) (i) candidates were asked to describe the process of artificial insemination. There was some confusion with IVF and references to male and female cows.

In part (c) (ii) most candidates were able to describe an advantage of artificial insemination. A common error was to write down a vague (and incorrect statement) such as "males are not needed".

A335/01 – Additional Applied Science A – Harnessing Chemicals – Foundation Tier

General comments

Most candidates appeared to have been entered correctly for this paper. There was no evidence to suggest that any of the candidates should have been entered for the Higher Tier Paper. Some candidates were entered for this paper that would possibly have been more suited to Entry Level.

Only a small proportion of the candidates left blank spaces. This seemed to be due to a lack of knowledge and understanding and not due to a lack of time. Any omissions can have a significant effect on the grade attained and therefore it is important that all aspects of the specification are covered and that candidates are encouraged to attempt every question.

The overlap questions with the Higher Tier were: Q4 (b) (ii), (d) (ii) and Q5 parts (a), (b), (c) and (e).

Recommendations for teaching

1. Give candidates plenty of practice at answering questions from past papers.
2. Encourage candidates to learn all the definitions.
3. Ensure that candidates have attempted a range of standard procedures.

Comments on individual questions

- Q1 This question was intended to be an easy start to the paper. However many candidates appeared to miss the significance of the emboldened word accurately in part (b) and gave measuring cylinder as the answer.
- Q2 This question proved to be surprisingly difficult for many candidates. In part (a) the link between product and type of formulation produced more correct responses than the link between formulation and description. In part (b) candidates were generally not giving an appropriate example of an emulsion or suspension.
- Q3 Part (a) was generally well answered. The most common incorrect response was 'fine'. Part (b) (i) appeared to cause the candidates some difficulty. The information required to complete the answer was available to the candidates in the stem of the question. A small number of candidates chose to use the chemical formula for water and carbon dioxide. If formulae are used it is important that they are correct in order to score the marks. In part (b) (ii) most candidates gave the correct answer. There appeared to be no common wrong answer to this question. Parts (c) and (d) were generally well answered. In part (e), whilst many candidates scored one of the two marks that were available, very few scored both marks. Candidates scored the mark for either the safety comment or its effectiveness but very few made appropriate reference to both. Neither response appeared to be more common than the other.
- Q4 In part (a), most candidates correctly identified the elements present in ammonia. Only a few chose to use chemical symbols. If candidates use such symbols, it is important that they are correct in order to gain credit.

Report on the Components taken in June 2008

In part (b) (i) the recycling idea appeared to be understood by many candidates.

In part (b) (ii), whilst many candidates gain a mark for the idea of operating 24 hours a day, very few scored the second mark for the idea of reactants constantly fed in and products constantly being removed. Some candidates gave the same response to part (ii) as they gave to part (i).

Whilst many candidates scored both marks in part (c), those who only scored one mark usually gained credit for the correct pressure reference. The most common wrong answer appeared to be 'a higher temperature'.

In part (d) (i) most candidates correctly identified the hazard symbol.

Part (d) (ii), which was common to the Higher Tier paper, produced very few correct responses from candidates of all abilities. There were many different incorrect responses. Some candidates put 'health and safety' which is mentioned in the stem of the question. Some put 'health and safety organisation'.

In part (e) many candidates did not arrive at the correct answer of 5% for the proportion of ammonia used to make nitric acid. Common wrong answers included 4% and 6%.

Q5 This question, with the exception of part (d), was common to the Higher Tier Paper.

In part (a) few candidates gained full marks. Candidates appeared to find it difficult to put the steps into the correct sequence. Many candidates did not have step A coming before step D. A few repeated step E, which they had been given as the starting step.

Part (b) was poorly answered by candidates of all ability. Answers that did not gain credit often made reference to doing it carefully.

In part (c) most candidates were able to identify the solute correctly.

In part (d), whilst many candidates appeared to know that aqueous was connected with water they did not give a creditworthy response. Some gave a one word answer 'water'.

The calculation in part (e) was not well answered. There were few totally correct answers and many did not give appropriate working out, or any working out, in order to score one mark.

A335/02 – Additional Applied Science A – Harnessing Chemicals – Higher Tier

General comments

The examination was relatively short, covering 36 marks in 45 minutes. There was no evidence that candidates were short of time. Only a small proportion of the candidates left blank spaces. This seemed to be due to a lack of knowledge and understanding rather than having insufficient time. Any omission can have a large effect on the grade attained and so it is vital that all aspects of the specification are covered and that candidates are encouraged to attempt every question.

Some candidates achieved a D grade on the higher tier and would have stood a better chance of achieving a C grade had they been entered for the foundation tier.

Recommendations for teaching

1. Give candidates plenty of practice at answering questions from past papers.
2. Encourage candidates to learn all the definitions, such as 'fine' and 'functional group' and memorise the required examples.
3. Ensure that candidates have been taught all aspects of the specification and have spent time practising all the higher tier skills.

Comments on individual questions

- Q1 This question differentiated well between all grades. Most candidates attempted all sections of the question. As in previous sessions, many felt most confident tackling the calculation in (c) (iii).
Part (a) proved to be a surprisingly difficult start to the paper, with some candidates leaving the question blank. The most common incorrect answer was 'accelerator'.
Part (b) was generally well answered. Sulfur dioxide was the most common guess.
In part (c) (i) most candidates scored one mark for recognising that pentanol and pentanoic acid were the reactants. Identifying water as a product proved to be more challenging. Some candidates wrote the formula for water and are to be discouraged from inserting formulae into a word equation.
In part (c) (ii) the term 'functional group' seemed unfamiliar to many candidates. The vast majority identified the molecule which was an alcohol. The best answers included 'R-OH' and 'C-OH'.
Part (c) (iii) was very well answered. The most common wrong answer was 101 due to candidates incorrectly tallying the number of hydrogen atoms in the molecule.
Responses to part (d) (i) were felt to be centre-dependent. Many candidates provided the clear, concise answer 'made in small amounts'. Many others stated that it was in 'small pieces' or was of a 'good quality'. Those who simply wrote 'small amounts' were not credited with the mark.
Many candidates were able to score one mark in part (d) (ii) having correctly identified that the batch process is slower than a continuous process. Marks for cost were only awarded if they explained each process in terms of labour and/or equipment. The most common incorrect idea for a disadvantage was that contamination would lead to a large amount of waste.
- Q2 This question proved very difficult for a large number of candidates. It was clear that many had not spent time learning all the definitions and examples specified in the specification.

Part (a) (i) was frequently left blank. Among guesses seen were 'solid in solution' and 'insoluble mixture'.

In part (a) (ii) examiners were pleased to see the vast majority of candidates attempting this question. Among the best answers seen were 'paracetamol tablets', 'indigestion tablets' and 'lo-salt'. Candidates who wrote 'salt', 'cake' or 'cement' were not credited with the mark. It is important that candidates make it clear that the example is a dry mixture. 'Cement powder', 'dry cake mixture' were credited with the mark.

In part (b) examiners were pleased to see fewer answers suggesting that an emulsifying agent must be present for an emulsion to form. Most candidates scored the first mark for stating that an emulsifying agent was needed to stop the emulsion from separating.

Q3 This question differentiated well at all levels and was attempted by all candidates. Part (a) was answered much more successfully than in previous sessions. Most candidates obtained 3 of the 4 marks available. A significant number believe that water should be added until the solution is made up to the mark before the beaker is rinsed with water and then added to the graduated flask.

Part (b) was generally well answered with most candidates scoring one of the two marks. The most common answer seen was 'to use a funnel'. A large number believed that the solution needed to be filtered. Others suggested placing a trough below the flask to catch any spillages or using a teat pipette to transfer it a bit at a time. Neither of which was credited with a mark. Among the best answers seen was 'pour the solution down a glass rod, through a funnel into the flask'.

In part (c) most candidates recognised the term solute and referred to the stem of the question to determine its exact identity. The most common incorrect answer was 'water'. A small number of candidates shortened the name potassium chloride to 'potassium' or 'chloride' and were not awarded the mark.

Part (d) proved surprisingly challenging to many candidates. The most common answer seen was 0.015 due to the numbers 1.5 and 100 simply being substituted into the equation.

Q4 This question differentiated well at all levels and all parts were attempted by all candidates. In part (a) most candidates were able to use the information in the stem of this question to arrive at the unbalanced equation ' $N_2 + H_2 \rightarrow NH_3$ '. Very few were able to balance the question correctly however. A large number of candidates chose to add another product to the equation, while others changed the formulae to N and H_3 .

In part (b) (i) the concept of sustainability was understood by the majority of candidates. Many referred to 'it' in their answer, implying hydrogen rather than natural gas. A small number mentioned pollution as a problem.

Part (b) (ii) was very well answered. Candidates were clearly looking at and using the diagram to formulate their answer.

Part (c) (i) proved surprisingly difficult for a large number of candidates, who gave the temperatures 350°C and 450°C as their answer. Others gave these two temperatures as well as a pressure of 400 atmospheres and were awarded one mark for the correct pressure. The best answer seen was 'low temperature and high pressure', demonstrating a clear understanding of the trends.

In part (c) (ii), while most candidates had the confidence to attempt this question, very few obtained the correct answer. The most common error was to divide 5000 by 2000, i.e. divide 5000 by 40% of the actual yield.

Very few candidates knew the answer to part (d). The most common answer seen was 'NHS'.

In part (e) (i) very few candidates had spent the time memorising the required formulae and many left this question blank.

In part (e) (ii) examiners were pleased to see a number of candidates writing the names of the salts below the formulae in attempt to work out the answer. The majority of candidates gained one mark for this question.

A336/01 – Additional Applied Science A – Materials & Performance – Foundation Tier

General comments

Candidates had been entered appropriately for this paper and were reasonably well prepared in most areas of the specification. However, there were many weak responses to questions which asked for a prepared example. This specification requires candidates to prepare examples which illustrate the application of a scientific principle. Centres are free to choose convenient examples, but candidates need to learn these in order to answer the relevant examination questions.

Better fluency in using scientific vocabulary would have improved the accuracy of many answers and some candidates may have gained more marks if they had been better able to express their ideas.

Comments on individual questions

- Q1 In part (a) most candidates correctly identified 'transparent' and 'stiff' but only more able candidates correctly identified 'malleable' and 'ductile'. A common error was to reverse these two properties.
In part (b) most candidates correctly identified elastic behaviour but a disappointingly small proportion could identify plastic behaviour. The words 'static' and 'rustic' were frequently selected.
- Q2 In part (a) the majority of answers gained a mark by stating that the magnifying glass would alter the colour seen when viewing the stamps, but some candidates did not make their meaning clear enough to be awarded the mark. Some candidates stated, incorrectly, that the green magnifying glass would distort the appearance of the stamps; while others incorrectly believed that they would appear blurred or misty.
In part (b) the great majority of answers seen correctly stated that the image produced by the magnifying glass would be enlarged.
In part (c) (i), although many candidates correctly identified the lens as converging, the majority of incorrect answers stated 'diverging'.
In part (c) (ii) more able candidates correctly selected 'refraction' as the process by which the lens changes the direction of the light rays, but weaker ones were less successful.
- Q3 In part (a) the highest-scoring candidates correctly matched the properties with their descriptions, but those scoring in the middle of the range frequently confused thermal expansion with thermal conduction. Most candidates identified the meaning of 'strong'. A very significant number of candidates either matched the mechanical properties correctly and the thermal properties wrongly, or the other way round.
Many incorrect answers matched one of the properties with the distractor, 'high mass per unit volume'.
In part (b) (i) the great majority of candidates correctly identified titanium as the most suitable alloy.
In part (b) (ii) about half the candidates were able to justify their choice of alloy. Many missed the mark due to a lack of comparison in their response, and although some referred to the properties, for example low thermal expansion, very few gave a reason for needing that property and so most failed to gain a mark.

In part (c) (i) there were relatively few correct answers, with many candidates selecting C rather than B to illustrate the 'solid solution' which forms a metal alloy (specification statement 6.2.9).

In part (c) (ii) the vast majority of answers referred to an improvement in strength and gained a mark, but a significant minority discussed properties in a way that could not gain credit. Many of these answers suggested that candidates were thinking of a specific alloy rather than alloys in general, but their answers did not make this clear so the sentences were incorrect. Some answers suggested 'alloys won't rust' and could not gain a mark, whereas 'alloys have better resistance to corrosion' would have gained the mark. A considerable minority stated that alloys can be 'shaped better' than pure metals. Answers referring to alloys being 'lighter' or 'cheaper' were not given a mark.

There was evidence of confusion between alloys and composites, with a significant minority believing that alloys combined the properties of the pure metals used to make them. This misconception concurred with the answers seen in Q3 (c) (i), where many candidates rejected the diagram B which showed very few 'different' atoms.

Q4 In part (a) (i) many candidates understood the need for product standards but in many cases they had difficulties in expressing their ideas. A mark could be awarded for the idea of either quality or of consistency so in most cases candidates gained a mark even where the distinction was unclear. Very few answers expressed the idea of fitness for purpose. A significant number mistakenly thought that the standards are used to check all items before sale.

In part (a) (ii) very few candidates could give a reason for using standard procedures for testing. Many repeated their answer to (a) (i) or suggested a reason for performing tests on individual products.

Candidates were generally poorly prepared for part (a) (iii) and could recall neither the organisations that set product standards nor their marks.

Equally, a disappointing number of candidates could not recall an example of a practitioner in part (a) (iv) whose job is to enforce product standards. Some incorrect answers were given but many candidates did not attempt to answer this question.

In part (b) (i) most of the more able candidates could calculate the mean correctly, but weaker candidates produced many incorrect figures.

In part (b) (ii) few of the weaker candidates could give the reason why Ted should test more samples, and only a small majority of the more able gained the mark. Many candidates who failed to score did not base their answer on the information in the question. A significant minority of these suggested that reliability needed to be improved, or, incorrectly, that more results were required for a fair test. A much larger proportion did not use the numerical information and failed to compare the observed results with the required figure of 12. In a small minority of answers, the candidate made a comparison with the advertised tog value of 13 rather the regulatory value of 12.

Q5 In part (a) the vast majority of answers correctly identified 'decibels'.

In part (b) the great majority of candidates scored at least one mark, by identifying either the sound level of a normal conversation or the threshold of pain. Relatively few made all the correct links.

In part (c) the majority of candidates identified the correct answer.

In part (d) the quality of answers was below that expected for recalling a previously-prepared example. Many candidates suggested a suitable material for controlling sound, but relatively few correctly stated whether the material absorbs or reflects sound. Many hard surfaces, for example bricks, were described as absorbing sound.

In part (e) (i) only the more able candidates could describe the link between vibrations with larger amplitude and a louder sound.

Some answers suggested that a 'loud vibration' makes a 'loud sound', and others implied that a vibration and a sound are distinct entities. Some answers stated that 'more vibrations' or 'more waves' make 'more sound', but with no suggestion of the idea of frequency or pitch; there were also many answers which incorrectly referred to pitch. No

answers were seen that referred to the sensitivity of the ear (specification statement 6.3.10).

In part (e) (ii) only a very few of the more able candidates described how equipment can be isolated from vibrations and the great majority of answers were of a very poor quality. Candidates should have been able to describe two examples of how to isolate from vibrations, yet the majority of answers suggested that they considered this question to be about soundproofing. A minority confused the question with earthquake protection. Many of the candidates' suggestions would have exacerbated the problem, as they frequently recommended that equipment should be clamped firmly to a rigid structure. Other suggestions were unrealistic and unrelated to the course content, for example restricting the movement of lorries on the motorway.

A336/02 – Additional Applied Science A – Materials & Performance – Higher Tier

General comments

This was the first major summer entry for this specification. The responses indicated that there are a number of areas in which Centres are unclear about the required preparation. Many entrants achieved low overall marks from responses that were confused or lacking in detail and which sometimes indicated little understanding of the subject matter being tested. Such candidates would have been better served by entering for the Foundation Tier.

Comments on individual questions

- Q1 Part (a) was well answered by most candidates.
In part (b) some candidates failed to use the terms 'reflect' or 'absorb' detailed in the question.
In part (c) (i) a minority of candidates linked loudness correctly with a larger amplitude, many confusing loudness and pitch. Few candidates recognised the ear's importance in understanding how sound is perceived, with a few recalling the importance of 2000Hz, but without being able to explain its relevance.
Part (c) (ii) received few good responses. The specification lists two methods for isolating equipment from vibration, which were occasionally given.
- Q2 In part (a) (i) two marks were awarded for two of the three reasons given in the specification, but most candidates only listed one.
In part (a) (ii) many candidates incorrectly suggested it being a 'fair test' as the reason. Here, as in many parts of this question, candidates failed to gain credit by repeating too closely the wording in the question.
Part (a) (iii) was generally well answered, with both BS and CE being often quoted.
In part (a) (iv) many candidates could not distinguish between those required to follow product standards (e.g. factory manager) or use them (e.g. product designer) and those who enforce them.
Part (b) was well answered, most candidates gaining both marks. Where the answer was incorrect it was often impossible to award a first mark as no working had been shown.
- Q3 Part (a) showed many clear and accurate calculations. Incorrect answers were usually obtained from inverting the division.
In part (b) very few candidates achieved full marks. The question's demand to use a diagram was ignored by some. Where, in a minority of cases, a clear circuit diagram was drawn, it was impossible to identify the subject of the test, the cable. Most candidates were confused as to the placing of voltmeters and ammeters, and even the power supply was omitted by many.
- Q4 In part (a) the question clearly stated that candidates should use the expression ' $Ft =$ change in momentum' to answer the question. This request was ignored by many. The most common response was to describe the action of the seat belt without reference to momentum and without linking the reduced force to the increased collision time. The specification clearly asks candidates to know the definition of velocity as 'rate of change of distance in a particular direction', but very few candidates could provide a correct response to part (b) (i), with mass, momentum and distance among the many quantities suggested.

In part (b) (ii) the majority of those who understood the calculation obtained both marks and where they failed to use the correct quantities in (ii), many gained marks in part (iii) for correctly evaluating their incorrect answer from part (ii).

The first statement in part (iv) is almost an exact quote from the specification, so it was disappointing to see the majority of answers being incorrect.

Q5 In part (a) there was clear confusion as to what constitutes a composite material. Responses referred to alloys and mixtures, with brass and steel being favoured together with 'cement and sand'. Many candidates made imaginative but usually futile efforts to provide a suitable material, but successful responses appeared to stem from good preparation by centres. Reinforced concrete was the most popular correctly explained answer. GFRP was also quoted, but in some cases this was confused with wire reinforced glass. This led to some interesting definitions of what constituted the fibre and what the matrix.

Those candidates who failed in part (a) were often more successful in part (b). However, many answers failed to identify either the material or the job for which it was used. Many candidates also identified an artefact, describing one component material and its relevant property, but then proceeded to a second material used in the construction. The reasons provided for the properties were also weak with many being simple definitions of the property itself, for example "the aluminium wing needs to be strong so that it will not break". For credit, answers were sought that defined the reason more explicitly. The quality of 'durability' was often used without any reference as to what that referred to.

A337 – Additional Applied Science A – Work-Related Portfolio

General comments

This was the first Awarding for the Work-Related Portfolio and the samples submitted reflected the great efforts made by Centres to develop courses tailored to the needs of their students. The quality of the work in the Portfolios was generally good in relation to the students' abilities and in most cases the content suggested a careful and well-motivated approach, at all levels of attainment.

A minority of Centres misunderstood the requirements and the assessment objectives. Some Centres had used an inappropriate mark scheme and Centres are reminded that all material for the GCSE assessment needs to be set and marked according to the OCR criteria. Using criteria edited in any way greatly increases the likelihood of differences with the moderation standards.

Administration

Centres should note the statement on page 70 of the specification: *'Evidence for all marks awarded must be available for moderation'*.

Centres should ensure that all records of candidates' observations and measurements are included in the Portfolio, both for the Standard Procedures and for the Suitability Test. Without this evidence, the moderator has no means of upholding the marks awarded.

The moderation process must sample the full range of scores and all teaching groups. The moderator thus needs a list that includes candidate number, teaching group and score. Unfortunately, the official electronic format for the MS1 forms does not include teaching groups, so Centres will need to supply these to the moderator by some other document.

The moderation team very much appreciated the prompt return of requested samples by Centres, and the well-organised content of the packages. Some Centres had omitted the front cover for the Portfolios, which caused problems for the moderators. A front cover should be attached to the front of each Portfolio submitted for moderation. By far the best method for securing Portfolios was the use of treasury tags, as recommended by JCQ. These secure the sheets yet allow the work to be seen and handled very easily. Candidates should ensure their name is written on each sheet.

Moderators discovered a surprising number of clerical errors in totalling and transferring marks. Centres are strongly advised to use a robust system for checking the accuracy of MS1 scores.

Standard Procedures:

Most of the activities for the Standard Procedures were entirely appropriate both for the assessment criteria and for the learning objectives of the module, but in a few cases they did not include enough steps for candidates to show they could follow step-by-step instructions. Examples include making a single measurement of pulse or of mass. Such activities can be extended, for example by making measurements in several situations, in order to meet the first criterion. In the great majority of cases the mark for appropriate accuracy had been awarded or withheld correctly, but could not be supported in certain tasks where the observation comprises only counting; for example, counting how many seeds germinate and finding how many masses

will break a thread. To give access to the fourth mark, these activities require another measurement or observation which requires more accurate judgement.

Suitability Test:

The different strands of the Suitability Test presented differing levels of challenge to Centres. Strands B, C and E were correctly addressed and scored in most cases, but Strands A and D were misinterpreted in a significant number of Centres.

In Strand B (a) the scores awarded appeared to be consistent with the ability of the candidate and annotation was often used to justify the marks given. In Strand B (b), some Centres over-scored tasks of limited complexity, for example measuring the temperature of warm water and simple paper chromatography. Very few examples were seen where candidates had developed the teacher's brief but where this had been done the work was sound and scores had been given correctly.

In Strand C many candidates had been able to devise independently a suitable format for recording their results, few had not performed repeat measurements in order to consider reliability, and most of the data collected was sound, albeit with some errors by weaker candidates. The quality of the practical work and recording was encouraging. In aspect (a) the great majority of scores were correct, but some were too generous where weak candidates had written a very simple table for a meagre amount of data and been awarded 6 marks. Teachers should recall that the marking criteria illustrate *quality of response* and that a very simple task, such as devising a very simple table, may not allow a response at the quality required for 6 marks. In this case, a lower mark should be given. The most common weakness of aspect (b) was a poor range of data, so that 6 marks were not deserved. For some tests to compare thermometers, a very narrow range of temperatures was used and in these situations over-scoring was common. This weakness also led to poor scores in Strand D (a) as any overall pattern in the results could not be well defined and the 6 mark criterion could not be attained. In Strand C (c) the quality of the data itself should be considered but in some cases this was confused with the number of significant figures recorded. In this Strand also, a very simple task can limit the marks awarded and this caused some over-scoring.

Candidates generally had made an effort to organise their reports carefully with a Contents listing and page numbering, and marks in Strand E (a) were given correctly. There was considerable variation in the use of scientific and technical vocabulary within the reports; for 6 marks, Candidates should use all the vocabulary from the specification which is relevant to the test. In some instances, candidates did not appear to have learned the basic relevant vocabulary; for example, in reports which compared antacids, many candidates did not use the term, 'neutralise'.

Strand A assesses the candidates' understanding of fitness for purpose. In aspect (a) the background information for a workplace context should be described, giving details of why and in what manner the object of the test is used in a particular workplace context. Many accounts written for Strand A aspect (a) were detailed, but did not well describe this information, digressing into other topics. Sometimes these involved details of the background science and some described possible consequences of not using the device, procedure or material. In such cases, the marks given were often more than those justified by the marking criteria. In too many instances, aspect (b) of Strand A was ignored or treated lightly. Omitting the criteria for suitability means that the purpose of the test is not defined, and thus makes it difficult to define what data is required and to form a sound conclusion as to suitability. Some Centres failed even to score the omitted aspect, so their marks for Strand A were much too high.

In Strand D, work was often seen which did not relate to the test results. The assessment objective is the conclusion based on the test results so much of this work could not be credited

according to the marking criteria. Where the range of results was limited, it was almost impossible to 'draw a correct conclusion from overall pattern of results' and the vast majority of conclusions were based on 'individual results or a simple pattern in results'. Some candidates had drawn many charts. If a chart or graph may aid the evaluation, it is prudent to draw one, but the assessment objectives do not include the drawing of charts and graphs. Strand D aspect (b) was addressed in a superficial manner on the whole. Many candidates failed entirely to evaluate the method and techniques they had used and yet were scored for suggesting 'improvements'. A suggested 'improvement' *must* address an identified weakness; otherwise it is a suggestion that is unrelated to the actual test carried out and is not part of an evaluation of that test. Many marks here could not be upheld.

Work-Related Report:

Centres varied considerably in their approach to the Work-related Report. Where a whole group attempted a report on the same occupation the content of the reports often followed similar ideas and candidates engaged with the subject matter to less depth than in similar groups who had covered several occupations. Where a group had been offered a completely free choice, candidates had engaged enthusiastically with the chosen occupation but sometimes the work they produced could not be credited against the assessment criteria and often the science content was lacking.

Almost all candidates had used more than one reference and the great majority correctly included a bibliography. In aspect (a) most marking was correct except where a weak candidate had included an interview. This does not automatically score 6 marks as the requirement is for '*relevant*' information from a '*variety*' of sources. 8 marks are reserved for highly selected details taken from the sources used, rather than for evaluating the sources. Some Centres had over-scored against the criteria by assessing on source evaluations rather than on the content of the report. For aspect (b), a bibliography is necessary to define clearly the sources used in the report and some marking was too generous where this had been omitted. It is strongly advised that the date of access to a website should be included when referencing the URL. Candidates were less skilled at citing references within the text (aspect (c)) and many omitted the sources of illustrations and charts. These should be included. Aspect (c) was generally scored correctly but some Centres had chosen to ignore it completely; thus their overall score for Strand A was too high and could not be upheld at moderation.

The quality of the content for Strand B was noticeably better in Portfolios where information was reworked rather than pasted. Pasted extracts were rarely highly relevant and even where several were used, rarely included all the relevant information. The great majority of reports that included pasted extracts earned 4 marks in aspects (a) and (b) for a partial account which did not amount to a description by the candidate. Although the majority of Centres scored this correctly, some Centres incorrectly awarded marks as if for a description. Some candidates had confused 'expertise' with qualifications and had been given too many marks for merely producing a list of qualifications. In many Centres aspect (c) had been addressed and marked correctly but in a significant minority there were evident misunderstandings. Aspect (c) assesses how well the candidate understands the effects of external constraints placed on an occupation. The financial context refers to the economics of the organisation, not to the money earned by one employee. 2 marks were allowed for stating the annual pay of an individual.

In Strand C, candidates scored well when they related the science they had studied to the occupation for the report, and when they could describe a skill with which they were familiar. In some cases candidates failed to recognise that the chosen occupation used science with which they were familiar, and in others, candidates copied and pasted sections of science they did not understand, which was often of minor relevance to the particular occupation. In both cases the work was usually over-scored. Where a technical skill had been well described by the candidate, some credit could also be given for the science content of the description. In some

Report on the Components taken in June 2008

cases, a description of the expertise required for the job had wrongly been marked as a description of a technical skill.

The great majority of reports had been appropriately structured, and it appeared that the concern to attain 6 marks in aspect (a) had not only led to a contents page and page numbering in most Portfolios, but also to a sensible sequence of ideas. Plenty of relevant illustrations were used to enhance the reports but some were credited as informative when they were decorative. There was reasonable use of scientific vocabulary in most reports, consistent with the ability of the candidate, but scientific vocabulary was usually very limited in Portfolios that lacked science content and in these cases Strand D was often over-scored.

Grade Thresholds

General Certificate of Secondary Education
 Additional Applied Science (Specification Code J632)
 June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A324/01	Raw	36	n/a	n/a	n/a	27	24	21	18	15	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A324/02	Raw	36	30	26	22	18	14	12	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A325/01	Raw	36	n/a	n/a	n/a	23	20	17	14	11	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A325/02	Raw	36	31	26	21	16	11	8	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A326/01	Raw	36	n/a	n/a	n/a	21	18	15	13	11	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A326/02	Raw	36	27	22	17	12	9	7	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A334/01	Raw	36	n/a	n/a	n/a	23	19	15	12	9	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A334/02	Raw	36	29	24	19	15	11	9	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A335/01	Raw	36	n/a	n/a	n/a	21	18	16	14	12	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A335/02	Raw	36	30	24	18	13	10	8	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A336/01	Raw	36	n/a	n/a	n/a	22	19	16	14	12	0
	UMS	34	n/a	n/a	n/a	30	25	20	15	10	0
A336/02	Raw	36	27	21	15	10	7	5	n/a	n/a	n/a
	UMS	50	45	40	35	30	25	23	n/a	n/a	n/a
A337	Raw	96	88	80	71	62	51	40	30	20	0
	UMS	150	135	120	105	90	75	60	45	30	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J632	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J632	0.0	0.8	7.8	34.0	65.8	86.1	95.4	99.1	100	31405

For a description of how UMS marks are calculated see:

http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Head office
Telephone: 01223 552552
Facsimile: 01223 552553

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