OCR
RECOGNISING ACHIEVEMENT

GCE

Applied Science

Advanced GCE **A2 H575/H775**

Advanced Subsidiary GCE **AS H175/H375**

Reports on the Units

January 2010

H175/H375/MS/R/10J

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

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

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REPORTS ON THE UNITS

G620, G621, G624, G625, G626: AS Portfolio Units

General Comments

All candidates should now be using the revised specifications for both AS and A2 work, which have been introduced for teaching from September 2009. It is hoped that these revised specifications will be accessible to both staff and candidates and should support the assessment of this applied A level subject.

Several new centres are now following this specification and it is evident from both the type and the quality of the work seen that many of the new candidates have previously studied some applied science. The majority of the candidates are competently carrying out a wide range of interesting research both on the internet and by actual visits. Most of the practical work seen shows a vocational link, with suitable reasons on why the experimental work needs to be performed. Credit should be given to those staff and candidates who are using the assessment criteria appropriately and consequently work is being assessed at the correct level. Many centres are now accredited and consequently, limited work was externally moderated this session. Accredited centres need to ensure that the necessary Centre Authentication Form is sent to OCR for each session that they are entering candidates for assessment and that if there is any change in the nominated staff OCR is informed.

The portfolio units moderated this session were as follows:

- G620 Science at Work
- G621 Analysis at Work
- G624 Chemicals for a Purpose
- G625 Forensic Science
- G626 Physics of Sport

Most centres were very responsive in returning scripts for moderation and moderators are very grateful to centres with low entry (less than 10 candidates) for sending all their portfolios directly to the moderator; this saved time and led to an efficient moderation exchange.

It was noticeable this session that the majority of centres returned the Centre Authentication Form with the candidates' work and most work was well organised and presented using treasury tags which allows moderators to easily read the work. However, there was a disappointing increase in the number of centres that made arithmetical errors; this was where there was a difference in the totalled mark on the URS and the mark submitted on the MS1. Centres are asked to check carefully the accuracy of their recording. Where centres are writing comments and page references on the URS forms, this is really appreciated and again supports the moderation process. Centres can try and help moderators locate the work by indicating the assessment code, e.g. AO1(a), and even better if they can indicate the mark band on the actual candidates' work.

Limited scaling of candidates' work occurred. Where marks were scaled, this was mainly at the higher mark bands, where work submitted did not reach the necessary standards required by the assessment criteria i.e. work was not sufficiently detailed and accurate and evaluations not at a high enough level for A grade work.

Work selected for moderation reflected coverage of all the units offered by this AS specification. A range of marks was seen. Candidates use and selection of research material obtained from the internet is showing a noticeable improvement, although there is still evidence of 'cut and paste' without suitable referencing.

Risk assessments are now being included with practical work as evidence of safe working, but possibly more guidance is needed to ensure these are suitably detailed and not generic. The numbers of candidates submitting work for the AS Units G620 and G621 has increased although work at different levels was still seen.

G620: Science at Work

The assessment requirements for the revised specifications now include:

AO1: record of four surveys of science based organisations; one in depth study; work on health & safety laws and regulations

AO2: evidence of impact organisation has on society; calculations on provided data or data obtained from experimental work

AO3: two practicals with a vocational context with recorded processed and evaluated results

The revised specification now requires only **four** surveys with the inclusion of assessment of spelling punctuation and grammar requirements within strand AO1.

Generally, the surveys were reflective of the requirements and assessment was within the accepted tolerance. Candidates are now including:

- the products made or services offered
- the type of work that takes place
- an identification of the science involved
- information on health & safety constraints and guidance used in the organisation

The weakest area was the related science: more focus is needed here and centres should try and give more guidance to improve the quality. The text of the survey should use candidates' own words. Information cut and pasted from internet sites is insufficient, although less and less of this is now seen. Excessive detail is not required for the surveys. This work is intended to be an overview of science in different organisations.

The range of organisations studied included zoos, garden centres, health clubs/gyms, supermarkets, bakeries, breweries, pharmacists, power stations, health centres, garages, colleges, universities, schools, fast food establishments, as well several manufacturing organisations. Again, work seen did reflect the guidance from the specification which resulted in studies that were focused on the correct requirements:

- explanation of what is produced or details of the service offered
- information about the organisation including the number and range of staff employed
- further details on the scientific job roles specifically related to the chosen organisation
- some explanation and detail of the science involved in the organisation
- any further specific detail on research, quality control
- details and specific links of health and safety laws and regulations that can be used for the requirements of AO1(c).

For mark band 3 the additional guidelines indicate a comprehensive study is required and information should be selected and clearly and logically presented. Some evaluation and justification of the use of the material also needs to be included for the higher mark bands. Comments on the validity of the sources used must be included if mark band 3 is to be reached. There was minimal evidence of evaluation and justification of the research material.

Assessment for AO1(c) generally was within the accepted tolerance and centres are working towards ensuring candidates give names of related health and safety laws and regulations. However, for mark band 3, it is important that the evidence shows that candidates understand how the organisations studied comply with the necessary laws and regulations. For AO2(a) where candidates had been given structured guidance, marks reflected the requirements of the specification and higher mark bands had been awarded. A simple statement of the overall effect of the organisation to society is insufficient for mark band 2 and above. Evidence of an understanding of the benefits of the core business of the organisation on society will support the higher marks.

Guidance to help could include:

- benefits of the core business to the society
- the contribution of the organisation to the economy
- details on waste management and environmental issues (where appropriate)
- ICT uses (where appropriate)
- details on the effect on the community of employment, transport issues and reasons for the position of the organisation

The assessment guidance states a number of complex and straightforward calculations should be completed. If the data produced for practical work does not allow candidates to fulfil the higher mark bands, then data can be supplied. It is useful if this is in the form of a task sheet written as though it had to be completed by a technician, rather than just set examples. Although the completion of set examples indicates competence, the work provided should be linked to the requirements of work to be done in the workplace. It should be noted that mathematical guidelines for straightforward and complex calculations are given in the appendix of the specification. For mark band 3, work should be correct and answers should be given to the appropriate degree of accuracy, with correct significant figures. Errors were still seen here.

This session, it was pleasing to see that the majority of centres were linking practical activities to a vocational context, consequently giving a reason for the completion of the practical work. Very few traditional AS practicals were seen and the centres should be complimented on the originality of some of the experimental work carried out. Some centres linked all the work to the in depth study e.g. health and swimming with the practical work linked to these organisations - analysis of the water; healthy eating and lifestyle. Organisations involving the production or treatments of materials were seen with practicals linked to the properties needed to fulfil the necessary requirements. Food preservation and micro biological experiments were quite common this session. However, candidates still need to ensure that for mark band 3, all relevant observations and measurements are made and recorded accurately with the appropriate precision. Some errors of significant figures and omission of units were often seen. Centres are reminded that mark band 3 work should reflect A/B level candidates. Some candidates are showing clear methods of processing their results for the higher mark bands. In some cases the evaluation of accuracy of apparatus and method is being included for mark band 3 but care still needs to be taken to ensure accuracy at this higher level. Processing skills in graphs and calculations were clearly evident in work seen but units are still missing from graphs and scales are poor, more guidance is needed on this.

G621: Analysis at Work

The assessment requirements for the revised specifications now include:

AO1: information showing an energy policy and energy usage of an organisation with a consideration of energy efficiency and environmental impact

AO2: study of large scale and small scale generation to include energy transfers with data and calculations to show a comparison of fuel costs

AO3: three practical analyses - one qualitative analysis, one quantitative and a third investigation with results processed and interpreted

The revised specification has amendments in AO1, the energy policy, in that evaluative work is now needed for mark band 3. In AO1(b) and AO1(c), requirements have hopefully been made more accessible and AO2 content should now link more to the assessment requirements. For AO3, three practical activities are now required with again the inclusion of spelling punctuation and grammar assessments in AO1(c).

Candidates are now finding good evidence to support AO1 energy policies. Sainsbury's, Tesco, colleges and universities and many local authorities have suitable information on energy and environmental work and this is now being fully researched. The assessment generally has reflected the requirements of the revised specifications with candidates being aware that for mark band 3 some evaluative work is needed on the chosen energy policy.

Environmental issues are very topical and this issue is now being covered in a lot more depth and at a high level by several candidates. Candidates still need to ensure that they extract relevant information and relate it to their chosen organisation. It is hoped that the additional guidance for AO1(b) & (c) will allow candidates to produce evidence needed for mark bands 2 and 3.

The revised specifications have hopefully addressed the previous in-balance of evidence needed to gain 1-3 marks in AO2(a). It is hoped that candidates will produce suitable evidence to compare large scale and small scale electrical generation. AO2(b) should give candidates the opportunity to look at energy values and fuel/energy costs and to carry out appropriate mathematical calculations related to this data.

The revision to the practical AO3 section of this unit should address the previous lack of opportunity to include energy related practicals. Centres can now include enthalpy of combustion experimental work or energy related investigations. Work seen generally reflected mark bands 1 and 2 but it still needs to be noted that work for mark band 3 needs to be suitably detailed, with evidence of vocational links. Evidence from the assessor that risk assessments have been produced, used and equipment has been safely used should also be included. Suitable evaluation is needed and this needs to be focused on the method and outcomes of the specific experimental work completed, not just a generic statement of the success of the work.

G624: Chemicals for a Purpose

The assessment requirements for the revised specifications now include:

AO1: a description of two examples of inorganic and two examples of organic chemical compounds, discussing their chemical structure, properties and uses and a detailed account of two compounds, one of which is made of oil.

AO2: relevant research of one industrial process that involves the use of a catalyst; a report that includes an understanding of the social, economic and environmental impact of the product selected.

AO3: a sample and account of the preparation of two products that have been synthesized, purified and analyzed.

It is hoped that the amendments in AO1 will allow candidates to study their chosen compounds in more depth and the requirements of the assessment criteria will allow differentiation from mark band 1 to mark band 3. AO2 content should now link more to the requirements of the specification and the catalytic work is focused on one industrial process. For AO3 two preparations are now required. Spelling, punctuation and grammar requirements are assessed in AO1.

This unit gives candidates the opportunity to extend their chemistry knowledge and study the properties and actions of examples of chemical products used in consumer goods. Care still needs to be taken to ensure accuracy in equations and evidence of 'cut and paste' tends to be seen in this unit much more than any of the others.

Candidates should be guided to choose compounds which will allow them to find information on both uses and properties of these compounds. For the chosen compounds, to reach mark band 3, details are needed on how the properties depend upon the structure and how uses depend upon the properties. Eleven marks are now allocated to AO1(c) which involves candidates producing a detailed account of two chosen compounds, one of which is made from oil. Candidates could do research and practical work to support the understanding for this section, and could link to AO3 if required.

It is hoped that candidates will extend their chemical and experimental knowledge by preparing both an inorganic and an organic compound.

For AO3(b) candidates need to ensure they present observations, draw diagrams and correctly show suitable processing of their results. This may involve calculations on theoretical, actual and percentage yields. The yield needs to be calculated correctly and, for mark band 3, how the theoretical yield is calculated should be included to reflect suitable knowledge at this level. For AO3(b), mark band 2 candidates should record all mass results to the same number of decimal places.

For AO3(c), candidates need to show an awareness that the yield can be increased by changing conditions. Actual workable suggestions are needed for mark band 2 and a full evaluation of the methods chosen with a possible comparison of the suggestions is needed for mark band 3.

G625: Forensic Science

The assessment requirements for the revised specifications now include:

AO1: a knowledge and understanding of the need to preserve and record the scene of crime the chemical, biological and physical techniques used to collect and visualise forensic evidence, including ethical considerations.

AO2: a report on a forensic case study on evidence and proof; work that demonstrates the use of calculations to support forensic measurements or observations.

AO3: at least one forensic analysis in each of the following areas - biological, chemical and physical techniques.

The revised specification has amendments in AO1 in that evidence is now directed to three strands chemical, biological and physical techniques, which link to the requirements of AO3. Spelling, punctuation and grammar requirements are again evident in AO1(c).

The forensic work moderated this session was limited with some very high level work being completed. Suitable research was seen for AO1(b) which covered chemical, biological and physical techniques. Work seen for the higher mark bands for AO1(c) did show an understanding of the need for an ethical code, and a range of relevant information on ethical issues in forensic work was produced.

Case study work tended to be quite good and the additional guidance given in AO2(a) allowed candidates to access the higher mark bands. Relevant information on evidence and proof was seen. This covered:

- the ways in which forensic scientists ensure the quality of evidence collected and analyzed is objective
- detail on limitations
- strengths and weaknesses of the analytical techniques used
- an understanding of the probability of guilt and of a need to review evidence.

Calculations included a range of Rf values for mark band 1, and refractive index calculations and bullet projectiles for mark band 2 and 3.

Experimental work again included work on fingerprinting and taking footprints, measuring and use of photographs, a range of microscopic techniques, chromatography, qualitative and quantitative analysis, and the measurement of refractive Index of glass. Mark band 3 candidates need to ensure detailed processing and interpretation of their results and a discussion of their significance.

G626: The Physics of Sport

The assessment requirements for the revised specifications now include:

AO1: a series of **four** short sport guidance leaflets for the coaches at a sport and recreation centre to help them answer questions of a technical nature for their trainees linked to - Measurement, Seeing, Movement and Technique

AO2: a presentation that will discuss the required material properties and how these are achieved in sports equipment; evidence of the completion of a number of calculations related to the physics of sport

AO3: evidence of two investigations relating to the physics of sport.

The revised specification has amendments in AO1 in that the evidence required will be only four leaflets - Measurement, Seeing, Movement and Technique. AO2 is linked to equipment and two investigations have been introduced to support AO3. Spelling punctuation and grammar is assessed in AO2.

The guidance leaflets produced by the candidates should indicate that they have used suitable research techniques and have selected the relevant information. The leaflets should not include large amounts of cut and paste information. Mark band 3 work needs to show detailed knowledge written in candidates' own words with evidence on the linking of scientific knowledge to the chosen sport or equipment.

AO2(a) gives the candidates the opportunity to present the work on properties of materials related to sports equipment as a presentation. It is hoped that evidence to support the giving of the presentation will be included. If candidates complete slides that include limited information, these should be supported with additional notes to indicate their knowledge and understanding.

It should be noted that time spent on practical work should relate to about 20 hours of class time. It is hoped that the addition of a further investigation will give candidates the opportunity to support practically the theory researched in this unit.

G622: Monitoring the Activity of the Human Body

General Comments

In general, the candidates performed in a similar manner to past examination sessions. It was reassuring to note that many candidates were able to complete the paper fully in the time allowed and tended to adhere to the rubric of the items across the five questions.

The paper reflected some changes to the previous AS level specification and therefore included some particular references to the sites of anaerobic respiration within cells and the link between early onset diabetes and obesity in the young. Items related to these new topics were generally not answered well and further preparation may be required for future candidates.

Comments on Individual Questions

1 (a) Although some candidates recalled the processes without any difficulty, many described the characteristics of living things and therefore struggled to achieve marks.

(b) Relatively few candidates recalled the precise location of aerobic (mitochondrion) and anaerobic (cytoplasm) phases of cellular respiration.

(c) Answered quite well by many candidates although some continue to be confused with glycogen and glucose.

(d) (i) The data in the table were analysed well by many candidates, who also calculated the changes after exercise.

(d) (ii) It was surprising to see that some candidates could not recall problems in the two systems and yet were able to express the effect on oxygen transport. The specific impact on oxygen reaching cells was the important feature of this item.

2 (a) Responses tended to focus on the benefits of observing bones and the risk of cancer. The concept of risk, rather than cause, presented a problem for some candidates.

(b) This proved to be one of the most challenging items. Although the more able candidates were able to describe image formation and shadowing, others struggled to describe the pathway of X-rays through the body and sometimes reverted to risks and avoidance techniques.

(c) It was unfortunate that some candidates considered that the MRI scan gave a 3D image, rather than focussing on the special feature of soft tissue resolution.

(d) There is some confusion between hazard, risk and safety precaution. Some candidates obtained full marks, whereas others were able to describe the risk of prolonged radiation and failed to obtain any further marks.

3 (a) Many were not challenged by the labelling of the heart but some described the incorrect valves and were unable to describe the 'left' ventricle etc.

(b) This description of a ventral view of the heart was difficult for many. However, some provided excellent descriptions of what they were able to see on the left side of heart, but viewed on the right of the diagram.

(c) A number correctly referred to adrenalin and increased heart rate but some unfortunately linked this item to sex hormones, particularly testosterone.

(d) The SAN item was sometimes described in terms of controlling factors, such as changes in carbon dioxide levels and/or blood pressure. This was not necessary for this item. This was also the case for some candidates who continued the story of excitation along the bundle of His etc.

(e) (i) Many realised that the equipment was an ECG machine but some confused this with a sphygnomanometer.

(ii) A number of candidates obtained this mark, no alternative pattern emerged in the responses.

(iii) Many were absolutely fine with this and used the traces to good effect. Some tried to incorporate the concept of irregular systole etc. but this was not evidenced in the traces.

(iv)(v) Generally answered well. No pattern of alternative responses was noted.

4 (a) Many candidates obtained at least 1 mark for the tidal volume but some were confused with this first interpretation of the spirometer reading, calculating 5 rather than the expected 0.5 value.

(b) Changes to spirometer traces were fairly well understood but some candidates were not able to achieve full marks because of the language used. There was also some confusion with a decrease in tidal volume, rather than the reality of increased values.

(c) Answered well by many candidates.

(d) (i) Very few were able to describe the purpose of a peak flow meter.

(ii) This was answered fairly well by many candidates.

(iii) Some good descriptions were provided for the impact of asthma on peak flow readings. A few candidates gave the explanation and forgot to give the description.

(e) (i) Generally well answered.

(ii) It was surprising to note that a number of candidates struggled with this item. Few candidates were able to achieve full marks.

(a)(b) Some candidates did not cope well with this item. Others were able to give correct responses, particularly for diabetes type 1.

(c) The link between early onset diabetes and obesity is a 'real world' and current topic. Further understanding is required for future candidates following this unit.

(d) (i) Many realised that the food was likely to contain glucose.

(ii) The general idea of comparing readings from a standard base line was understood by some, but not many, candidates.

(iii) The calculation was completed without any problems for a number of candidates. No clear pattern of alternative responses was observed.

(iv) Many candidates identified the curves correctly and gave reasonable explanations/evidence. Some became quite confused and were unable to achieve many of the marks available.

(v) It was surprising to note that some candidates could not describe the operation of biosensors. Many did not recognise the need to take a blood sample.

(e) (i) The concept of hazards presented some problems for a significant number of candidates, who tended to confuse this with risks. General descriptions of 'contamination' were not sufficiently precise.

(ii) Many were able to successfully describe the relevance of sterilising syringes/equipment and disposing of sharps in containers.

G623: Cells and Molecules

G623/01 Planning exercise

Titration with DCPIP and comparison to known vitamin C concentration standards were common approaches in the majority of candidate scripts.

It is suggested that centres remind their candidates to read the instruction brief carefully to avoid misinterpretation.

It is also suggested that centres provide students with a self assessment tick sheet to ensure that the students have addressed all the marking points in their plans before final submission.

Please can centres ensure that:
(i) attendance registers for the planning component are included with the candidate scripts;
(ii) candidate plans and tests are sent in separate OCR envelopes using the labels provided, to enable effective script tracking for BOTH components.

A This needs to be a working document relevant to the intended practical work. An appreciation of electrical (colorimeter/blender), glassware, biohazard (allergies) and relevant chemical hazards need to be recognised.

B The prediction needs to make a comparative reference to both species of Kiwi fruit. Many candidates referred to 'kiwi juice' or just one species.

C Justification of the prediction needs to be made using secondary sources and information on the accompanying OCR Insert.

D/E/F/G The majority of students did consider preliminary work. Where preliminary work was included, candidates justified or related it to the main method of the investigation in some cases. Preliminary work must inform the main method. Examples could include: methods of juice extraction; mass of tissue; type of tissue to use; range and concentrations of DCPIP/ascorbic acid. Since reasons for the preliminary work lacked sufficient detail, G was rarely awarded this session.

H/I The majority of candidates did consider at least two secondary sources, at least one coming from a researched source. Candidates from some centres provided useful quantitative secondary data to support their predictions. However, some only used references as stated on the insert. Candidates must ensure that full reference details are given and they must state how these sources have helped in the investigation.

J/K Many candidates achieved marking points J and K. Many wrote in some detail regarding their chosen method to enable reasonable degrees of accuracy and reliability.

L/M Students need to give a comprehensive list of equipment for M with qualified names and quantities. Some students failed to list the kiwi fruit material or recognise the importance of a comparison to known vitamin C standards to determine the vitamin C content of each species of fruit.

N Whilst the majority of candidates did appreciate the importance of repeats, some failed to appreciate the need for experimental data to be comparative.

O/P Whilst many candidates stated a range of two different species of kiwi fruit, few appreciated the need to use suitable vitamin C concentration standards. Consequently criterion P was rarely awarded. Very few candidates wrote about the need to compare their results to known vitamin C concentration standards. Consequently criterion O was rarely awarded.

Q/R Many candidates stated a minimum of three variables as independent, dependent and controlled variables, very few candidates explained how these variables were to be controlled. This needs to be explicit in this section of the plan.

S Many candidates planned to tabulate their data in a suitable format. However, appropriate units of measurements must always be included in the headers. S was awarded on some occasions for the display of serial dilution data.

T Many candidates planned to display their results graphically as a bar chart of kiwi species against concentration of vitamin C. Some candidates chose to present calibration curves as % transmission against concentration of iodine in potassium iodide solution. Care must be taken to ensure that axes are labelled with appropriate units and multiple graph lines are clearly labelled if more than one appears on a set of axes.

U Mean volumes of ascorbic acid or fruit juice were the most common calculations seen in scripts. Some candidates were awarded U for their use of titration data or calibration curves to calculate vitamin C content.

V Very few students addressed possible conclusions. Many candidates made reference to 'juice from one species of kiwi fruit having more vitamin C than the other' without links to their observations i.e. the higher the concentration of vitamin C, the lower the volume of juice needed to decolourise the DCPIP. Those that did failed to link possible conclusions to confirm or reject their prediction.

W Some students were able to recognise at least one possible source of error in their equipment/method although many stated generalised human errors which could have been avoided with due care and attention. Two are needed to award this marking point such as end point determination following titration; air bubbles in the burette; burette blockage with extract; variation in drop volume; degradation of vitamin C standards.

X Some candidates were able to suggest at least one possible method to improve the accuracy of their data (usually by suggesting an alternative method). Some students quoted the need to refer to published data to improve validity. Centres are advised to ensure that candidates can distinguish between the terms accuracy and validity to enable suitable improvements to be suggested in the future.

G623/02 Test

General Comments

Each of the questions and the paper as a whole achieved satisfactory differentiation between candidates. There was no evidence of candidates failing to complete the paper due to lack of time. There was no common misinterpretation of the rubric.

Comments on Individual Questions

1 Many candidates could access this question. Many scored 7 out of the eleven marks.

(a) A minority of candidates gave good descriptions to gain all 3 marks. Details of how the tissue is obtained were omitted or lacked precision in some cases. Few candidates referred to the use of an appropriate stain or the avoidance of air bubbles. Candidates need to be more familiar with the terminology of basic equipment such as microscope slide and cover slip.

(b) (i) This was answered well by most candidates. The only general difficulty experienced was with the identification of the 'lysosome' (E).

(ii) Most candidates gained one or two marks. The slight relaxing of the mark scheme allowing 'higher magnification' and 'clearer/more detailed' benefitted a significant number of candidates. However, candidate responses needed to be comparative to gain both marks.

2 (a) Few candidates scored all 4 marks. 'Phospholipid' was frequently identified; the remaining three labels were often confused and 'protein' was regularly included.

(b) Well answered - some otherwise 'poor' candidates scored well in this section.

(c) Generally well answered.

(d) (i) Few candidates could correctly recall the food test results for protein and non reducing sugar.

(ii) Many candidates were aware of the 'emulsion test'. However, few of these gave a sufficiently detailed description to include the addition of the lipid sample to ethanol followed by the adding of the lipid/ethanol sample to water to gain both marks.

(iii) Many candidates made reference to 'cloudy' or 'milky' despite having given little or no details of the actual test in (ii). However, 'white' was often disqualified by reference to a 'precipitate'.

3 This question was a good discriminator and proved challenging for all but the very able candidates.

(a) Values between 10 and 19 were seen but many candidates were able to give the correct value. The convention to count cells that lie on the middle of the triple lines on the north or west sides of the grid should reveal a total of 16 cells.

(b) Very few candidates gained all three available marks. Marks awarded often came via the 'error carried forward' route, having given an incorrect answer in (a).

(c) (i) 'Possibility of counting dead cells' and 'non-uniform sampling' were common answers offered by relatively the few candidates who could give an adequate reason for the estimate.

(ii) This was well answered by the majority of students with 'fewer cells' or 'paler cells'.

(d) (i) This was not answered well. Those students who had learnt about the Coulter counter and could describe its use in a clear and logical way scored well in this section. However, it was disappointing to note that only a very small proportion gained more than 1 mark in this section.

(ii) 'Quicker' was the most common response amongst candidates; the other 3 alternatives did appear but rarely.

4 (a) Some knowledge of the clinical symptoms of Huntingdon's disease was displayed by the majority of candidates although sometime too vague to gain marks. Many gave 'dementia/memory loss' as a common response.

(b) Whilst more able candidates could relate moral and ethical implications of diagnostic testing to the subjects in the question stem, few gained full marks due to limitations in the coherence of their answers as outlined in the banded mark scheme. Weaker candidates were able to score at least one mark for pursuit of elective abortion, although their responses often included inappropriate references to the unborn child and/or medical practitioners.

G627, G629, G632, G633, G634: A2 Portfolio Units

General Comments

All candidates whether they are studying AS or A2 now need to be using the revised specifications from September 2009. This does include candidates who started their course using the original specification before September 2009. It is hoped that centres will find the new specification and assessment criteria improved and accessible to both staff and candidates and any of the amendments that have been made will support the teaching and learning of A Level Applied Science. For more information, please read the new specifications and sample assessment materials found on the OCR website (www.ocr.org.uk). Centres should look at the revised specifications on the OCR website under 14-19 Applied A Levels. There is now reference to assess spelling, punctuation and grammar in the portfolio units, and the opportunity to reach A* for the higher ability candidates.

It was noted by both moderators and the senior examiner team that candidates' portfolio work at A2 showed a marked improvement in research skills, evidence of independent working and more selective use of the internet. However, care needs to be taken that mark band 3 work shows the appropriate accuracy and correct detail. There were cases where marks were scaled at the top end as work here was not considered to be at A grade A2 level. Centres need to be aware that when awarding full marks at mark band 3, the work should be free of any minor errors, should reflect independent work and show full evidence of understanding.

The portfolio units moderated this session were as follows:

- G627 Investigating the Scientist's Work
- G629 Synthesising Organic Chemicals
- G632 The Mind and the Brain
- G633 Ecology and Managing the Environment
- G634 Applications of Biotechnology

Centres were again very responsive in returning scripts for moderation and where there was low entry (less than 10 candidates) it was appreciated when centres sent all scripts directly to the moderator; this saved time and led to an efficient moderation exchange.

Centres are again asked to include the tasks sheets given to the candidates as this helps to support the moderation process, very few were seen.

It should also be noted that centres need to be accredited separately for the AS and A2 qualification.

G627: Investigating the Scientists' work

The assessment requirements for the revised specifications now include:

AO1: a detailed and workable plan for one scientific vocational investigation, to include the aims and objectives, full details of experimental work with constraints under which the work will take place, and documented evidence of appropriate research.

AO2: evidence showing the tracking and understanding of the outcomes of the investigation with evidence that data collected has been processed and interpreted.

AO3: evidence to show the investigation was implemented safely and an evaluative scientific report on the outcomes has been produced.

The only amendment for the revised specification is evident on the assessment grid. It is hoped that the requirements for AO1, AO2 & AO3 are now more selective and make the assessment more logical.

Investigations chosen should build on work studied at AS level and it is hoped that support for this will be included in the scheme of work during AS studies. Investigative work seen this session included analysis of bleach, supported by microbiological practical activities. This range of practical work clearly allowed the higher mark bands to be reached as a wide range of experimental procedures and techniques were included. Some interesting forensic investigations were seen with excellent processing of results. However, candidates choosing forensic work for their investigations must take care to include a range of experimental techniques and procedures if they wish to access the higher mark bands. Candidates need to show evidence that they have completed a range of practical skills and not repetition of the same. Investigative work on esters was another example of work seen this session and, although some A2 level chemistry experimental work was evident, candidates aiming for an A grade should be providing evidence of a range of different techniques. Again, some of the popular investigations were:

- food analysis
- vitamin C in a range of food products and drinks
- yeast /sugar/fermentation
- health and fitness
- effects of stimulants, energy drinks, caffeine etc on performance.

It is important that the standard of experimental work is A2 level and candidates have the opportunity to use equipment that will provide suitable accurate data for processing. Centres are encouraged to include evidence that candidates had actually carried out the practical work with further evidence that they had completed and used risk assessments. A statement written on the candidates' work is sufficient or alternatively a certificate of completion of practical.

It was good to see work where candidates had thought out their own investigative and experimental requirements. A suggestion is to give candidates a topic and then get them to ask a question about the topic, this can then allow a number of candidates the opportunity to work on the same basic investigation but allows an individual approach.

AO1 should now include a workable and clearly presented plan and selected research to include the following:

- vocational links
- experimental work (note a range is needed for higher mark bands)
- health and safety guidance
- suitable referencing of sources (validation of sources is needed for higher mark bands)

Some candidates are still being quite repetitive in their chosen experimental work. A variety of different techniques is preferred. Predictions are not needed however; the aims and objectives of the investigation should be clearly stated.

Risk assessments need to be included with all experimental work to fulfil the health and safety requirements.

The report does not necessarily need the candidates to include details of methods used etc. A standard procedure that was used can be attached. The report needs to show the outcomes of the investigation with suitable evidence of an understanding of the scientific concepts involved. Centres also need to ensure candidates relate the outcome to the original aims of the investigation. Mark band 3 guidance indicates that candidates should not only indicate how the investigation achieved its aims and objectives but also give a discussion of the reliability of the work carried out. Again, centres need to take care that work assessed at mark band 3 is accurate and suitably detailed to reflect A grade work.

Evaluations need to focus on the whole investigation not just single experimental tasks. Where suitable amendments are included, the level of supporting discussion needs to be high if mark band 3 is to be awarded.

G629: Synthesizing Organic Chemicals

The assessment requirements for the revised specifications now include:

AO1: a report or leaflet that demonstrates an understanding of organic chemistry by the correct identification and naming of functional groups, the importance of different types of isomerism and different types of reactions; an investigation of therapeutic drugs, their usage and mode of action in the body.

AO2: research on a process used to manufacture an organic compound showing an understanding of factors to be considered by the manufacturer, to include information about costs and benefits of the product; evidence of appropriate calculations.

AO3: practical work on two organic compounds; detailing preparation and purification methods (to include some planning); make, record and display observations and measurements; evidence of processing results (to include % yield); suitable conclusions and evaluation included.

The revised specification has hopefully reduced the requirement to cover too many reaction types in AO1, in order to allow candidates time to explain the science in the different reaction types. AO2 has minimal revision with additional bullet points to support AO2(b). The requirements for AO3 no longer expect the preparation of an anti-inflammatory drug.

Limited work was seen this session for this unit.

The work for AO1 needs to be focused on the requirements of the specification and not just a repetition of candidates' notes. Evidence for higher marks should show suitable selection to reflect the guidance given in the assessment criteria. For AO1(a), classification and identification of functional groups, with evidence of understanding the different type of isomerism work, needs to be accurate and clearly focused to the requirements. The importance and an explanation of isomerism linked to specific examples are really needed to secure mark band 3. Candidates need to ensure accuracy when giving organic formulae, too many mistakes were seen in both basic formulae and in equations. For AO1(b) the explanation of reaction types needs to be linked to organic chemistry and not generic explanations. The revised specifications have now limited the research required on the drug types so it is hoped that more detail and understanding can be demonstrated by candidates.

AO2 work needs to show evidence of research work on a process used to manufacture an organic compound; alcohol, several selected haloalkanes, esters and medicinal drugs were chosen. AO2(b) needs to focus on costs and benefits to individuals, companies and society, associated with the manufacture of the organic compound.

Preparations of aspirin, ethanoic acid, benzoic acid, iodoform (triiodomethane) and paracetamol can be used. Candidates need to take care that for mark band 3, risk assessments are accurate and sufficiently detailed. Risk assessments tended to be mark band 2 rather than mark band 3. Candidates still need to be guided to ensure they record suitable observations for both their preparations and to ensure the processing of results is recorded and completed to a sufficiently high level. Evidence of calculations of theoretical yield are needed. Evaluation of the process again needs to detailed and focused on the techniques used, sources of errors and reaction route. Centres need to note that a total of 26 marks is allocated to the practical work and hence between 25 to 30 hours should be allocated to AO3 work.

G632: The Mind and the Brain

The assessment requirements for the revised specifications now include:

AO1: the production of two sets of fact sheets designed to raise mental health awareness, one set on stress and illness and the second set on research methods employed in the study of the healthy and damaged brain

AO2: an evaluation of the scientific methods and techniques used in the study of mind and brain, together with a consideration of associated ethical issues and evidence of statistical research

AO3: the design and safe execution of a simple experiment to investigate one aspect of cognitive function and an investigative study on memory.

The revised assessment requirements include minimal change for AO3 just a rearrangement of the requirements.

Candidates continue to produce interesting information on stress and illness and the healthy and damaged brain. Suitable selection of material is being seen from the higher level candidates but care needs to be taken that the information is appropriately presented in the form of fact sheets and not as a set of reports. Suitable referencing is also needed.

AO2(a) again allowed candidates to produce information giving the clinical methods of studying the brain. Diagnosis of brain diseases was generally well covered and some good illustrations supported the candidates' work.

Work for AO2(b) moral and ethical implications of brain research tended to be mark band 2. Mark band 3 work needs to reflect the statements given in the assessment criteria. Much more comprehensive discussion and conceptual considerations are needed to reflect these higher mark bands.

AO2(c) does ask for a fact sheet detailing statistical evidence. Candidates are using a wide range of statistical testing on their results but additional information is still needed to ensure the higher mark bands.

Centres need to note that 26 marks are available for AO3 and therefore candidates need to spend the appropriate time in their experimental work (25-30 hours). For mark band 3 a range of data needs to be collected and processed. Generally suitable statistical processing was completed on experimental data. For AO3(e) mark bands 2 & 3, care needs to be taken to ensure the requirements of the criteria are suitably covered.

G633: Ecology and Managing the Environment

The assessment requirements for the revised specifications now include:

AO1: a knowledge and understanding of the effects of change on ecosystems and biodiversity, describing ecological succession and researching the effects of agricultural practice, human habitation and greenhouse gas production.

AO2: information on scientific moral and ethical reasons for preserving ecosystems and species diversity; descriptions of methods used to manage ecosystems and to preserve species diversity with information on the success of a project managing one ecosystem; calculations on ecological data.

AO3: a planned investigation of an ecosystem; with relevant observations made and recorded; data displayed, interpreted and results related to the occurrence and distribution of the species within the ecosystem.

The revised assessment requirements include only minimal changes in wording, the main assessment remains unchanged.

This unit continues to produce a lot of high quality work from the candidates. Candidates' work indicated interest and enthusiasm in this topic area and although candidates seem to enjoy completing large quantities of work for this unit, care needs to be taken that suitable selection of researched material is presented in portfolios. However, for mark band 3, candidates need to ensure that work demonstrates both a thorough knowledge and understanding of the factual information and that evaluations, where needed, are at an appropriate high level to reflect A grade A2 work with suitable justification included.

Calculations were usually linked to data gathered from practical work carried out. However, centres need to ensure that if they are going to use this, suitable opportunities are given for candidates to collect quantitative data. Good statistical analysis was seen in this section.

A good range of practical work had been carried out by candidates. Generally, candidates had taken part in field trip work; this is an excellent opportunity for candidates to produce high quality work. A range of experimental techniques were seen and it was good to see photographic evidence of work carried out. Risk assessments were not as detailed as those seen previously and candidates should be producing suitably detailed risk assessments that are usable. For AO3(c) the displaying of data did show a range of different ways, kite diagrams were often seen to support data display, but accuracy needs to be maintained for mark band 3 work. It is essential that conclusions at mark band 3 show suitable interpretation of results and are related to the occurrence and distribution of species within the ecosystem studied.

G634: Applications of Biotechnology

The assessment requirements for the revised specifications now include:

AO1: the production of an information booklet to include information on the science of genetic engineering and the use of recombinant DNA technology in medicine or agriculture.

AO2: description of how successful DNA technology is in food production with suitable conclusions based on evidence found; financial, statistical evidence involving calculations; consideration of the moral and ethical issues and the impact of legislation associated with using genetically modified food plants.

AO3: a practical investigation into enzyme technology (including the production and use of an immobilized enzyme); to include the construction of a bioreactor and the effect of temperature on enzyme activity.

The revised assessment requirements include minimal changes in wording, the main assessment remains unchanged.

Candidates are now showing some understanding of the information produced for AO1 on the science of genetic engineering and the use of recombinant DNA technology. Work for mark band 3 should indicate that work has been suitably selected from a variety of sources; it is clearly and logically presented with correct spelling, punctuation and grammar. Work moderated this session contained much less unnecessary cut and paste material.

For AO2(c), mark band 2 work on moral, ethical and environmental issues concerning the use of recombinant DNA technology in the production of GM plants, needs an explanation of two types of controls placed on scientists that work in this field. Mark band 3, however, needs a more detailed report with additional explanations and evaluative work on the two types of controls placed on scientists and how effective they are.

For AO3 generally, suitable practical work was seen but still plans need to be clearer. Care needs to be taken that suitable immobilised enzymes are prepared and used. Evidence of good displays of results need to be included for AO3(c). Conclusions and interpretation of results are still basic and candidates need to check they spend the appropriate time on AO3(c) and AO3(d) to ensure sufficient coverage. For AO3(d), level 2 candidates need to check that as well as interpretation of results and basic conclusions, the advantages of using bioreactors and enzyme immobilisation are included.

G628: Sampling, Testing and Processing

General Comments

Around 300 candidates presented themselves for this examination, a similar number to those of previous years in the January session.

Many candidates again scored between thirty and fifty (out of 90). There were fewer candidates than in the past who scored more than 55. A small number of candidates seemed ill-prepared for this examination and could only manage 25 marks or less.

As in previous examinations, there was evidence of careful pre-examination work with the case study material and also work with past papers. Questions that test a candidate's ability to design an experiment for a specific purpose were again, generally weak. Candidates should ask themselves whether their design would actually work - in many cases this did not. Some candidates still fail to answer questions with sufficient academic rigour for an A2 paper.

In calculation questions the use of percentages and standard form continues to be challenging for significant numbers of candidates.

The responses given by candidates did not suggest that the paper was too long.

In general the examiners felt that the paper had performed well and that candidates had an opportunity to demonstrate and apply their knowledge.

Comments on Individual Questions

1 (a) (i) The need for representative sampling was well understood.

(ii) Many candidates failed to realise that the focus was on the selection of the berries.

(iii) Most candidates correctly implied that contamination of healthy material could be a problem.

(iv) This was an easy two marks for almost all candidates.

(v) Correct storage was the most common answer that gained merit.

(vi) Many candidates realised that this would affect the taste or concentration.

(vii) The examiners were looking for a variation between people. This was not always given.

(b) (i) Most candidates gained this calculation mark.

(ii) Many candidates gave the unclear response 'amount of fertiliser' rather than the volume of the fertiliser solution.

(iii) Sadly, some candidates did not recognise the need for a control in these experiments.

(iv) The answer needed to be specific and simply stating 'measure the growth' did not merit a mark.

(c) (i) Most candidates gained both marks; the information for which was in the Case Study.

(ii) The answer was 0.0002 g but many candidates could not cope with this answer provided in standard form on their calculators.

(d) Many apparatus designs were poor and lacked a size indication.

(e) The material for these two marks were easily gained by use of the Case Study.

(f) (i) The need for cleanliness before the use of a pestle and mortar was well recognised.

(ii) Candidates understood well the need for risk assessments.

(iii) It is a pity that so many candidates did not notice that dichloromethane was described as flammable and used a method involving naked flames.

(iv) Many candidates could not cope with this percentage calculation.

(v) This proved challenging and the award of two marks was uncommon.

(vi) Very few candidates could devise a further experiment to improve purity.

(vii) Peak area gives quantitative information rather than the identification of the component.

(viii) Very few candidates knew that the molecular ion provides the relative molecular mass.

(g) Most candidates had researched the meaning of the word 'diuretic'.

2 (a) (i) The mean size of the particles was usually calculated correctly.

(ii) It was surprising to see a number of examples of bad plotting and poor curves on the graph.

(iii) Although most candidates realised that the size decreased, fewer indicated that the sizes of the ash particles became similar after 300 km from the volcano.

(iv) Most candidates gained this easy subtraction mark.

(v) Again, standard mathematical form defeated many candidates.

(b) The question required comments about vehicle usage. Relatively few focused on this aspect. In (b)(ii), many candidates did not realise that the effect is greatest when the sun is most intense.

(c) (i) Many designs were poorly thought out and could not work.

(ii) Again, the use of mathematical powers defeated many, although some gained one mark for inserting the numbers correctly.

(d) (i) The function of the flowmeter was well known but many candidates had not researched the use of silica gel.

(ii) Most candidates realised that the funnel needed to point downwards to exclude unwanted solids and water.

(iii)(iv) There were problems for many candidates in the numerical manipulation of the data.

(e) Although easier than (d)(iii) and (iv), many candidates could not use the numbers provided.

(f) (i) The reasons given for the use of a fume cupboard were generally correct.

(ii) The general rules for obtaining a pure solid from a solution were seldom provided.

(iii) This calculation was discriminating and only the strongest candidates gained full credit.

(iv) The reasons for heating to constant mass were not very often seen.

3 (a) (i) Many candidates found the correct mass of copper in the bronze sample.

(ii) This was very poorly done. Few candidates had apparently found the density of an irregular object experimentally in their centre. The units of density were given to assist those to whom the method was unfamiliar but very few good answers were seen.

(b) (i) Most candidates used the graph correctly but very few could state the reasoning behind it.

(iii) Many candidates gained full credit for giving three considerations to be taken into account when choosing a suitable method for analysing brass.

(iv) Using more concentrated acid, heating, and the use of a catalyst, were popular correct responses. 'Use more acid' was ambiguous and did not receive credit.

(v) Candidates seemed familiar with how to treat 'rogue' points in graphs.

(vi) This simple percentage sum was surprisingly poorly done. The use of significant figures caused problems for some candidates.

(c) The duration of the experiment, the temperature and the concentration of the salt water were the commonest acceptable variables that would need to be kept constant.

G635: Working Waves

General Comments

Although the paper was well answered up to pass level, fewer candidates than previously gave responses significantly above this.

Generally, questions requiring simple recall were answered by more candidates than those that required understanding. Fewer still applied good practice learnt in other parts of the course: in Question 1 few candidates measured more than one wavelength and divide by the number of wavelengths. Fewer still repeated and averaged their measurements.

Comments on Individual Questions

1 (a) (i) This was generally well answered. Common errors were to draw lines across several wavelengths, or large sine waves, or circles.

(ii) Most candidates accurately measured the single wavelength they had drawn in part (i) but losing the marks for improving accuracy by measuring longer lines and dividing by the number of wavelengths and repeating their measurements. Most included the correct unit in their reading and were successful in converting according to the scale given. Most also included the correct unit in their final answer. A minority gave incorrect units such as m/s and Hz.

(iii) This straightforward question was well answered. A common incorrect answer was radio. Others attempted (usually incorrect) descriptions rather than giving an example.

(b) This question discriminated well between candidates. Many of those who knew the equation were able to substitute correctly, but failed to manage the division, commonly adding the powers of ten.

(c) Very few numerical answers were seen. Some failed to score because they simply stated that the audio frequency was lower than the radio frequency. Some indication of the size of the difference, such as the word ‘much’ was required.

(d) (i)(ii) Many correct answers were seen. Others appeared to have heard the words, but recalled them incorrectly. Minor spelling mistakes were condoned but not incorrect words.

(iii) Many candidates who had known what the initials stood for had little understanding of their meaning. Few were able to give a full and clear answer including the fact that the sound signal caused the modulation and that frequency was constant in the case of AM and amplitude was constant in the case of FM.

(e) As might be expected, this was well answered. Most incorrect answers were other parts of the e-m spectrum but a small minority of answers were not even electromagnetic waves.

(f) Many correct answers were seen. Answers linked to the wavelength showed some understanding but missed the point that the radiation is absorbed in the atmosphere. Some candidates stated that the uv could not travel through a vacuum.

2 (a) (i) Although most candidates scored at least one of these marks, few gave a full description of the colour changes in the correct sequence. Some candidates failed to recognise that the furnace emitted visible radiation and referred to the kind if image seen on an infrared camera such as false colours.

(ii)(iii)(iv)Most candidates correctly answered part (iv), but the number of incorrect answers (including 'no change') suggests that some were guessing especially for parts ii and iii.

(b) (i) It had been expected that this would be an easy introduction to the later subsections, but less exact and inaccurate answers such as 'heat radiation', 'hot body' 'black body', 'vapour', 'background', 'emissivity', and 'ultra violet' were seen.

(ii) Most candidates recognised that people emitted more power (the answer 'more radiation' was accepted on this occasion) and many linked this to the temperature difference compared to the surroundings. Only the best candidates recognised that there is also a difference in frequency or wavelength.

(iii) Most candidates had some idea of the appearance of the output from the thermal imaging device but some made no reference to the differences in colours or brightness.

3 (a) This question asked candidates about how to explain *total internal reflection*. Most answers were much broader accounts of fibre optics and scored few of the marks available for clearly understanding the links between refractive index and total internal reflection.

(b) (i) Although many candidates were able to identify one difference, most commonly the cladding, few gave sufficiently full answers to score all three marks.

(ii) Many candidates gained some credit for showing by means of text or diagram that they had some knowledge of multiple paths and/or degradation of the signal. Few were able to fully connect these two concepts.

(iii) Many candidates scored some marks by reproducing a diagram showing curved paths. More candidates than previously stated that the refractive index gradually decreases radially towards the outside. Unfortunately some of these omitted the term 'refractive index'. Many showed gaps in their understanding by stating incorrectly that the different rays travel at the same speed, but these often gained some credit for recognising that the rays arrive at the same time.

(c) Many correct answers, often reproduced verbatim from the specification.

4 (a) (i)(ii) More candidates were correctly able to explain digital than analogue. Incorrect answers sometimes described the signals as old or modern, others confused the terms with types of modulation.

(iii) Few fully correct answers. Many simply redefined digital.

(iv) Many correct diagrams scored several of the marks available, although few labelled the axes. Analogue to digital conversion, and number expressed in binary form were also commonly achieved marking points. Candidates who had apparently not learned this topic scored few if any marks.

(b) Many candidates were able to draw a suitable diagram of cells containing base stations. A number described uplink and downlink correctly. Other details given commonly failed to answer the question which asked how cells and base stations allowed large numbers of phone users. Accounts of multiple access systems did not answer this question. Although some candidates reproduced diagrams showing cells numbered 1 to 7 suggesting that they had been taught about frequency re-use, clear explanations of this were rare.

5 (a) (i) Many correct answers. Metal was too vague. Incorrect answers included other specified metals, plastic and film.

(ii) Many candidates drew the components in the wrong order, suggesting little understanding of how the grid works. Commonly these candidates went on to suggest that the grid prevented the 'wrong' kind of X-rays reaching the patient. Some may have confused the grid with other devices covered in the specification.

(b) Many scored lower level marks by demonstrating understanding at the level included at AS level, but few demonstrated that their understanding had moved beyond this. Some answers implied that candidates did not realise that CAT scanners use X-rays. Fully correct answers were rare.

(c) (i)(ii) Part (i) was generally correctly answered and most candidates made some reference to cell death or damage in part (ii), many scoring another mark by attributing this to ionisation. A minority confused their answers to these two sub-sections. Few achieved full marks by including the chemical change stage in part (ii).

(d) (i)(ii) Few correct answers were seen suggesting that this topic had not been learnt in many cases.

(e) Many correct answers. Protective clothing was sometimes stated and was too vague. 'Leaving the room' was too similar to 'standing behind a screen' to be allowed as an 'other' precaution. Answers such as not eating or drinking were not sufficiently specific to a radiology department to score.

Grade Thresholds

Advanced GCE Applied Science AS (H175, H375) and
GCE Applied Science A2 (H575, H775)
January 2010 Assessment Session

Portfolio Unit Threshold Marks (AS)

Unit		Maximum Mark	a	b	c	d	e	u	Total nos of cands
G620	Raw	50	43	38	33	28	23	0	781
	UMS	100	80	70	60	50	40	0	
G621	Raw	50	43	38	33	28	23	0	340
	UMS	100	80	70	60	50	40	0	
G624	Raw	50	42	37	32	27	22	0	62
	UMS	100	80	70	60	50	40	0	
G625	Raw	50	43	37	32	27	22	0	74
	UMS	100	80	70	60	50	40	0	
G626	Raw	50	42	37	32	27	23	0	100
	UMS	100	80	70	60	50	40	0	

Examined Unit Threshold Marks (AS)

Unit		Maximum Mark	a	b	c	d	e	u	Total nos of cands
G622	Raw	90	66	58	50	42	35	0	1565
	UMS	100	80	70	60	50	40	0	
G623	Raw	90	73	64	55	47	39	0	126
	UMS	100	80	70	60	50	40	0	

Portfolio Unit Threshold Marks (A2)

Unit		Maximum Mark	a	b	c	d	e	u	Total nos of cands
G627	Raw	50	44	39	34	29	24	0	178
	UMS	100	80	70	60	50	40	0	
G629	Raw	50	43	38	33	29	25	0	29
	UMS	100	80	70	60	50	40	0	
G632	Raw	50	44	39	34	29	25	0	25
	UMS	100	80	70	60	50	40	0	
G633	Raw	50	43	38	33	28	24	0	92
	UMS	100	80	70	60	50	40	0	
G634	Raw	50	43	38	33	28	24	0	55
	UMS	100	80	70	60	50	40	0	

Examined Unit Threshold Marks (A2)

Unit		Maximum Mark	a	b	c	d	e	u	Total nos of cands
G628	Raw	90	63	56	49	42	36	0	302
	UMS	100	80	70	60	50	40	0	
G635	Raw	90	59	51	43	36	29	0	323
	UMS	100	80	70	60	50	40	0	

Specification Aggregation Results

Uniform marks correspond to overall grades as follows.

Advanced Subsidiary GCE (H175):

Overall Grade	A	B	C	D	E
UMS (max 300)	240	210	180	150	120

Advanced Subsidiary GCE (Double Award) (H375):

Overall Grade	AA	AB	BB	BC	CC	CD	DD	DE	EE
UMS (max 600)	480	450	420	390	360	330	300	270	240

Advanced GCE (Single Award) (H575)

Overall Grade	A	B	C	D	E
UMS (max 600)	480	420	360	300	240

Advanced GCE (Double Award) (H775)

Overall Grade	AA	AB	BB	BC	CC	CD	DD	DE	EE
UMS (max 1200)	960	900	840	780	720	660	600	540	479

Cumulative Percentage in Grade

Advanced Subsidiary GCE (Single Award) (H175):

A	B	C	D	E	U
2.3	11.4	34.1	70.5	97.7	100.0
There were 93 candidates aggregating in January 2010.					

Advanced Subsidiary GCE (Double Award) (H375):

AA	AB	BB	BC	CC	CD	DD	DE	EE	U
0.0	0.0	0.0	4.0	8.0	28.0	56.0	76.0	84.0	100.0
There were 25 candidates aggregating in January 2010.									

Advanced GCE (Single Award) (H575):

A	B	C	D	E	U
0.0	28.6	57.1	85.7	100.0	100.0
There were 7 candidates aggregating in January 2010.					

Advanced GCE (Double Award) (H775):

AA	AB	BB	BC	CC	CD	DD	DE	EE	U
0.0	0.0	0.0	0.0	33.3	100.0	100.0	100.0	100.0	100.0
There were 3 candidates aggregating in January 2010.									

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums/index.html

Statistics are correct at the time of publication.

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