OCR
RECOGNISING ACHIEVEMENT

GCSE

Applied Engineering (Double Award)
Applied Manufacturing (Double Award)

General Certificate of Secondary Education **GCSE 1492**
General Certificate of Secondary Education **GCSE 1496**

Report on the Units

June 2008

1492/1496/MS/R/08

OCR (Oxford, Cambridge and RSA Examinations) is a unitary awarding body, established by the University of Cambridge Local Examinations Syndicate and the RSA Examinations Board in January 1998. OCR provides a full range of GCSE, A level, GNVQ, Key Skills and other qualifications for schools and colleges in the United Kingdom, including those previously provided by MEG and OCEAC. It is also responsible for developing new syllabuses to meet national requirements and the needs of students and teachers.

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 syllabus 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.

OCR will not enter into any discussion or correspondence in connection with this Report.

© OCR 2008

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

CONTENTS

General Certificate of Secondary Education

Applied GCSE (Double Award) Engineering (1492)
Applied GCSE (Double Award) Manufacturing (1496)

REPORT ON THE UNITS

1492 Engineering - Chief Examiner's Report

Centres are to be congratulated on ensuring that candidates, on the whole, have experienced a range of engineering contexts and can apply this both in coursework and the written examination. Good quality portfolio work and examination papers were again in evidence this year.

Portfolio units 4866 and 4867

General Comments:

The majority of Centres completed and forwarded the required documentation to moderators by the set deadline, however some Centres were more casual about submitting the paperwork by the required date and this did slow down the moderating process.

Centres with 10 candidates or fewer should follow OCR requirements and forward all work to the moderator along with the required paperwork by the set deadline in May.

It was particularly helpful where Centres had completed the URS form to identify and locate evidence. Good practice was observed where Centres had numbered pages and used evidence only once.

The majority of Centres forwarded CCS160 forms with samples of work, however several still needed to be sent reminders regarding the production of such forms.

Issues did arise where internal standardisation had not been carried out or where there had been no internal checking of marks transferred from the CSF forms onto the MS1.

Best practice was shown by Centres who used A3 or A4 presentation folders and placed candidates' sheets in individual plastic wallets. Problems occurred when centres used a single wallet per strand and multiple pieces of work were placed in this.

The use of dividers and other methods of separating the five strands of work in the candidate's portfolio was much appreciated as this helped focus the moderator and made the process of approving Centres' marks so much easier.

An increase in the use of writing frames has been noted and where this is seen as a benefit to some candidates, Centres should use them with caution as it is felt that a limited space to insert information may restrict opportunities for more able candidates to demonstrate their capability through greater depth of response.

Centres should consider carefully which project will be attempted in Unit 4867 as it is a requirement that the making of the engineered product should use at least one process from each of the following categories; material removal, jointing and assembly, treatment processes and surface finishing.

Unit 4866 Design and Graphical Communication

Strand a

Strand a1 was answered well with the majority of candidates producing a design specification from a given brief. However, in some cases, it was difficult to identify who is the customer/client.

Candidates tend to present a wide range of associated information, however caution must be observed regarding material which is relevant to the project and that which may be just padding. Questionnaires with conclusions supported through the use of graphs and pie charts are a regular feature in the majority of portfolios moderated, though, once again, candidates must make sure that such information is related to the main area of study. More able students justified these decisions.

In this strand best practice was seen through candidates returning to their customer and discussing findings, which then led to a revised specification being produced.

Strand b

Candidates attempted strand (b1) very well by presenting ideas which met their identified specification. However the level of accuracy of the drawings produced did vary enormously across the candidates and it should be noted that in this strand a range of ideas is expected. In b2 candidates used a range of drawing techniques to develop ideas. Good practice saw CAD packages used to support the production of drawings for developed ideas.

In b3 many candidates did explain why drawing techniques had been used to present ideas. However in far too many cases this element had been ignored by candidates or they had spent time producing notes/statements evaluating how ideas met the specification.

Strand c

The majority of candidates managed, in c1, to identify health and safety issues which were related to their design solution, however in some cases these tended to be a list of key points which were not developed or fully explained.

In strand c2 the majority of candidates identified quality control issues and most went on to explain how they would be carried out.

Best practice saw this information detailed and explained for each stage of making in a production plan format or similar. However very few candidates evaluated the quality control procedures. Far too many candidates who attempted strand (c3) only presented definitions of quality assurance or total quality management rather than relating these procedures to the work produced.

Strand d

Strand d1 was well attempted by candidates. However those that failed to score well in this strand tended to do so because they did not separate the work required here from that produced in strand b.

It is important that candidates realise that work in this strand is an opportunity to present ideas to the client/customer and should be a development of the work produced earlier. In some cases marks had been awarded for a presentation to peers without any evidence of external

client involvement. This strand offers an opportunity to present the work to clients using PowerPoint; however the presentation should be relevant to the final product and not purely a conversion of pages from the candidate's portfolio into slides.

Best practice in this strand saw candidates developing the work produced in strand b and presenting a range of annotated drawings, including CAD, and models to the client. Digital photographs were used to support such presentations. More able candidates justified their final solution to the customer and used feedback to highlight further improvements that could be made to the product.

Strand e

Engineering processes that would be used to produce the candidate's final product were identified in the majority of cases. However to gain maximum marks in (e1) these processes should not only be listed they should be explained. Similarly in (e2) the various quality assurance procedures that could be carried out at each stage of production should be explained and not left as a list of possibilities. More able candidates did explain work presented in (e1 & e2) and then went on to evaluate and justify this in (e3). However very few candidates fully answered the requirements of e3 by failing to describe making their product using "real world" procedures.

Unit 4867 Engineered Products

Strand a

Strand a1 was well answered with the majority of candidates describing an engineering process. Best practice saw candidates describe an engineering process that would be used later in the project.

Candidates appear to have a good understanding of how to produce production plans. Many of the plans seen followed the requirements of the assessment grid identifying engineering processes and quality control.

Strand a3 was poorly attempted with very few candidates presenting any evidence of evaluating their production plans in relation to engineering processes and quality control procedures.

Strand b

There was a mixed response to strand b1 with some candidates ignoring this part and starting the strand at b2. Other candidates gave a short response to the importance of accurate production planning and meeting the specification, thinking that it was sufficient just to list a few key points. Best practice saw candidates identifying key issues and describing these points in detail with reference to their own plans and product specification.

Candidates attempted strand b2 well, with many including estimated times as a part of their production plan, many presented additional information in the form of supporting Gantt charts. Strand b3 was poorly attempted with very few candidates giving any evidence of evaluating their production plans in terms of how the schedule for making their product could be improved.

Strand c

In the majority of cases candidates identified key control points and health and safety issues. Much of the information given was related to the products being made and not just generic information. However it must be noted that to gain maximum marks in c1 candidates are

expected to describe the importance of health and safety. Where candidates failed to provide such information but were awarded full marks for c1, marks had to be adjusted accordingly. Many candidates explained how identified quality control tests were carried out and why they were necessary.

Best practice saw candidates making use of annotated photographs to show quality control tests being carried out and safe working practice in action.

Strand d

There were a variety of responses in this strand ranging from a list of bullet points to a basic general description. However best practice included a written description of relevant ICT use with supporting annotated photographs to help explain the processes. Good answers not only explained why ICT was used but evaluated the processes stating the benefits of the system. It should be noted that this strand requires candidates to explain how they used ICT in making their product. Far too many candidates spent time describing the design process and use of CAD packages failing to extend their explanations into how the product would be produced using CAM.

Strand e

The majority of candidates were able to describe how they had produced their product. Once again best practice made use of digital photographs to support the text in e1. Some candidates explained why the tools and equipment used were appropriate to the task, however many did not fully answer strand e2, as they did not develop explanations once tools had been identified. Only a limited number of candidates addressed e3 fully, far too many candidates failed to explain how their product would be made in a “real world” situation. Evidence was presented by some candidates of real world engineering processes however it is important that such work is relevant to the candidate’s product, and that reference is made to the product.

4868 Engineering Written paper

Q1) **(a)** Almost all candidates answered this part well gaining full marks. Those who did not most generally had the memory stick and television swapped.

(b) Most candidates answered well, though some gave an example of a technology used in the production of the product rather than in the product itself. In contrast to a similar question in June 2007, few stated different products from those given.

(c) Most candidates named one of the remaining sectors correctly.

Q2) As in previous sessions, most candidates were well-prepared for this question and there was a wide range of products, though mobile phones continued to dominate. As stated in the question, marks were not awarded for points copied from the example given (a digital camera). This limited marks awarded for mobile phones. In other cases the marks awarded to candidates were limited by the technology used by the product selected. More able candidates used correct terminology with confidence and showed understanding. Weaker candidates were nevertheless able to gain marks from simple statements.

Q3) **(a)** **(i)** Almost all candidates answered well. Responses covered the full range given in the specification.

(a) **(ii)** **and** **(iii)** It was disappointing that very few candidates gained full marks on what should be a familiar topic. Many gained marks for making relevant points but did not go on to expand on them.

Using CAD is incorrectly perceived as superior in all aspects by some candidates.

(b) This question was, on the whole, well-answered with many candidates clearly drawing on their practical engineering design experience.

Q4) **(a)** **to** **(e)** This familiar style of question was generally well-answered with some inventive responses to part (d). Those who gained no marks on part (e) generally gave single word unqualified responses such as ‘cost’.

(f) The majority of candidates did not address benefits to ‘society’ as requested. Some concentrated on environmental issues, as in similar questions on previous papers.

Q 5) Candidates’ knowledge of materials continues to give concern. Many had difficulty with this question.

(a) Stainless steel, brick, concrete and GRP were the most popular choices. Candidates found naming an appropriate product more straightforward than a property. Some candidates chose different materials from those listed, gaining no marks.

(b) As in previous sessions, many candidates could not identify an example of a composite material or a ceramic other than those given. Aluminium and titanium were frequently given as examples of alloys.

(c) Most candidates selected stainless steel for this part question. Most gave one appropriate benefit, but few gave two. Again, single word responses let some candidates down.

Q6) Few candidates had knowledge of the practical applications of robotics and PLCs. As in past papers, there was some misunderstanding as to the basic features and functions of a PLC and benefits compared with a general purpose computer. Responses in general referred to benefits common to both types of control (e.g. programmable).

Q7) Over 15 percent of candidates omitted parts of the question which was aimed at higher ability candidates. There were few full responses.
It is disappointing that candidates continue to have little knowledge and understanding of Computer Integrated Engineering and its benefits. Nevertheless, many marks were awarded for making relevant points, though these had not been developed to show relevance to CIE.

Q8) Responses to this question were limited, as expected, with few gaining high marks.

(a) For full marks, candidates need to show clear links between **control technology** and **production safety**.
In general responses were disappointing, though more candidates followed the guidance on answering discuss type questions than in previous sessions, and many were able to give at least one sound example. Some candidates discussed production safety in general terms, without linking it to control technology; others concentrated on potential hazards arising from the use of automated equipment.
There were, however, very few examples along the lines of 'machines may malfunction or run amok', common in previous sessions.

(b) For full marks, candidates need to show clear links between **ICT** and the **range of products available**
The most popular points made centred on internet shopping. Again, few candidates gained full marks. Some concentrated on the use of ICT in daily life, or in industry generally.

1496 Manufacturing - Chief Examiner's Report

General Comments

Centres are to be congratulated on ensuring that candidates, on the whole, have experienced a wide range of manufacturing contexts. Good quality portfolio work and examination papers were again in evidence this year, many making reference to 'real life' manufacturing.

Portfolio units 4878 and 4879

General Comments:

The majority of Centres completed and forwarded the required documentation to moderators by the set deadline, however some Centres were more casual about submitting the paperwork by the required date and this did slow down the moderating process.

Centres with 10 candidates or fewer should follow OCR requirements and forward all work to the moderator along with the required paperwork by the set deadline in May.

It was particularly helpful where Centres had completed the URS form to identify and locate evidence. Good practice was observed where Centres had numbered pages and used evidence only once.

The majority of Centres forwarded CCS160 forms with samples of work, however several still needed to be sent reminders regarding the production of such forms.

Issues did arise where internal standardisation had not been carried out or where there had been no internal checking of marks transferred from the CSF forms onto the MS1.

Best practice was shown by Centres who used A3 or A4 presentation folders and placed candidates' sheets in individual plastic wallets. Problems occurred when Centres used a single wallet per strand and multiple pieces of work were placed in this.

The use of dividers and other methods of separating the five strands of work in the candidate's portfolio were much appreciated as this helped focus the moderator and made the process of approving Centres' marks so much easier.

An increase in the use of writing frames has been noted and where this is seen as a benefit to some candidates, Centres should use them with caution as it is felt that a limited space to insert information may restrict the depth of response that more able candidates are capable of offering.

In Unit 4879 candidates must show evidence that they have produced a batch of items made up of at least three components or ingredients which should be manufactured by a team with tasks allocated to individuals. In many portfolios it was difficult to establish what had been produced and by whom. Best practice used photographic evidence to show the batch of items produced.

Unit 4878 Designing Products to Manufacture

Strand a

In strand a it is important that candidates work to a client/customer design brief. In several cases it was difficult to identify who the client/customer was.

In general strand a1 was well answered with the vast majority of candidates working from a given design brief. Initial specifications varied in content from a short list of bullet points to those that listed and explained key points. Associated information in a2 regularly featured questionnaires with charts to outline the view of potential users. It appears that candidates spend a lot of time in gathering associated information but it is important that this information is relevant to the project and that time is not wasted gathering what may be termed as “padding”. In a2 the customer/client should be consulted so that a developed specification can be created. Candidates who scored well in this strand provided judgements indicating why as well as how they used customer feedback and associated information.

Strand b

b1 was well attempted, with all candidates presenting ideas that would answer their design brief. However it is important that they annotate such ideas making reference to points identified in the specification. Several candidates made use of a chart where design ideas were listed and awarded marks against points from the specification. Best practice was seen when candidates used such a table but also presented and evaluated the final design idea.

Strand c

Candidates, in c1, identified health and safety issues in the work environment; however several failed to relate these issues to the manufacture of their product. In c2 quality control procedures were identified but in some cases no explanation was given as to why they were necessary or how they would be carried out. Best practice was seen when candidates made use of annotated digital photographs to highlight issues.

Candidates who attempted c3 tried to evaluate quality control procedures but many failed to grasp the concept of total quality management. Several candidates provided a definition of total quality management but many failed to relate this to their product.

Strand d

d1 was attempted by the majority of candidates with work being developed from material presented in strand b. Good use of modelling in a variety of forms, CAD to prototypes, was also seen in d2. Some candidates also made use of PowerPoint presentations to explain their design solution to the customer. However several failed to develop work in this strand and produced presentations that featured pages of their design folder rather than the final idea. An important element of this strand requires the interaction between the candidate and the client. In many portfolios there was a lack of evidence to highlight feedback to the client.

Strand e

Those candidates that attempted e1 scored well and a good understanding of manufacturing processes was evident. Centres should note that e1 requires candidates to identify processes that would be used to produce the product in quantity. In e2 a variety of methods were used to show the stages of manufacture and quality assurance procedures. Best practice saw candidates using a combination of production plans and annotated digital photographs.

A limited number of candidates answered e3 well, with real world issues being ignored by many candidates. Those candidates that attempted this section gave examples of manufacturing in the “real world”; however such work should be relevant to the candidate’s product. Best practice saw candidates evaluating the manufacture of their product and relating this to “real world” production methods.

Unit 4879 Manufactured Products

Strand a

The majority of candidates answered a1 well, by describing a manufacturing process. Best practice saw candidates explaining a process that would be used at a later stage when manufacturing their selected product.

a2 was well answered with the majority of candidates presenting a production plan; most of them included manufacturing processes and quality control points as part of the plan. However not many candidates scored well in a3 as very few carried out evaluations of their production plans in relation to manufacturing processes and quality control procedures.

Strand b

Many candidates described the importance of production planning but some failed to address the second element of b1 regarding the importance of the specification.

Production plans produced as part of strand a tended to include estimated time schedules and therefore fulfil the requirements of b2, although it was evident that many candidates present additional schedules in the form of Gantt charts. It is important that candidates attempt the second requirement of b2 and that is to allocate roles to team members.

Candidates who scored well in this strand reflect on the schedule of manufacture and explain how it could be improved. They also state why specific roles have been given to particular team members. Unfortunately, as identified in strand a, very few candidates evaluate their production plan in terms of improving the schedule or why roles were allocated.

Strand c

In c1 candidates identified key control points and provided evidence of health and safety issues but several failed to describe the importance of health and safety. Some candidates presented health and safety issues in generic terms and did not relate them to the batch of products being manufactured. c2 was quite well addressed, with candidates using quality control checks. Best practice was seen by candidates who used annotated digital photographs to show quality control procedures being carried out and the application of health and safety regulations. Some candidates addressed c3 by explaining how production planning and scheduling could be improved. Others went on to define total quality management in general terms but very few candidates applied this to their products.

Strand d

d1 was well addressed, with candidates having a good understanding regarding the features of good teamwork in the manufacture of a product. However some candidates only produced a list of features without explaining the key points.

The allocation of team roles when producing the batch of items, as required in b2, was addressed by the majority of candidates.

Only a limited number of candidates attempted strand d3 where they are required to reflect on ways of improving the production of the product by more effective use of the team. Very few candidates explained the effect of buying in components or ingredients.

Strand e

e1 was attempted by the majority of candidates with varying levels of success due to the amount of information that was provided. Some candidates presented little more than a revised production plan, others presented a detailed diary of events. Higher attaining candidates developed this work in e2 when they explained why tools, equipment and processes used were appropriate to the task. Best practice saw such work being supported through the use of annotated digital photographs to record each stage and provide evidence to show the batch of products produced by the team.

Strand e3 was poorly attempted with many candidates failing to evaluate their product in terms of tools, equipment and processes they had used. Similarly evidence of real world processes was either missing or very limited. In some cases where real world processes were identified the candidates failed to relate them to their product.

As this unit is about a team working to produce a batch of items there should be evidence in this section of the batch of items that has been produced. This could be in the form of annotated digital photographs. Far too many candidates failed to include such material in their portfolio.

4880 Manufacturing Written paper

Q1) **(a)** Most candidates answered this part well, gaining full marks.
(b) Many candidates gave an example of a technology used in the production of the product rather than in the product itself. In contrast to a similar question in June 2007, few stated different products from those given.
(c) Most candidates named two appropriate products

Q2) As in previous sessions, most candidates were well-prepared for this question, and there was a wide range of products, though mobile phones continued to dominate. As stated in the question, marks were not awarded for points copied from the example given (a digital camera). This limited marks awarded for mobile phones. In other cases the marks awarded to candidates were limited by the technology used by the product selected. More able candidates used correct terminology with confidence and showed understanding. Weaker candidates were nevertheless able to gain marks from simple statements.

Q3) **(a)** **(i)** Most candidates gave a general benefit of CAD rather than of **saving** a CAD file.
(a) **(ii)** Very few candidates gained full marks on what should be a familiar topic. Many gained marks for making relevant points, but did not go on to expand on them. Using CAD is often incorrectly perceived as superior in all aspects to drawing by hand.
(b) This question was, on the whole, answered well, with many candidates clearly drawing on their practical experience.

Q4) **(a)** **to** **(e)** This familiar style of question was generally answered well, with some inventive responses to part (d). Those who gained no marks on part (e) generally gave single word unqualified responses such as 'cost'.
(f) The majority of candidates did not address benefits to 'society' as requested. Some concentrated on environmental issues, as in similar questions on previous papers.

Q5) Candidates' knowledge of materials continues to give concern. Many had difficulty with this question.
(a) Most candidates could give at least one example in one of the material areas, some gave full correct responses. Textiles being the most popular choice. However on the whole, few were familiar with a range of materials and their properties.
(b) Most candidates gave sound answers.

Q6) Few had knowledge of the practical applications of robotics and PLCs. Around twenty percent made no response to part (bi) or (bii). As in past papers, there was a widespread misunderstanding as to the basic features and functions of a PLC and benefits compared with a general purpose computer. Responses frequently referred to benefits common to both types of control (e.g. programmable).

Q7) There were few full responses to this question. It is disappointing that candidates continue to have little knowledge and understanding of Computer Integrated Manufacturing and its benefits. Nevertheless many marks were awarded for making relevant points, though these had not been developed to show relevance to CIM.

Q8) Though there were few good responses to this question, many candidates gained some mark.

(a) For full marks, candidates needed to show clear links between **control technology** and **production safety.**

Many candidates discussed production safety in general terms, without linking it to control technology. Others concentrated on potential hazards arising from the use of automated equipment.

There were, however, very few examples along the lines of 'machines may malfunction or run amok', common in previous sessions.

(b) For full marks, candidates need to show clear links between **ICT** and the **range of products available**

The most popular points made centred on internet shopping. Again, few candidates gained full marks.

Grade Thresholds

General Certificate of Secondary Education
Applied Engineering (Double Award) (Specification Code 1492)
June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
4866	Raw	50	45	40	35	30	25	20	15	10	0
	UMS	100	90	80	70	60	50	40	30	20	0
4867	Raw	50	45	40	35	31	25	20	15	10	0
	UMS	100	90	80	70	60	50	40	30	20	0
4868	Raw	100	70	62	54	46	41	36	31	26	0
	UMS	100	90	80	70	60	50	40	30	20	0

Specification Aggregation Results

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

	Maximum Mark	A*A*	AA	BB	CC	DD	EE	FF	GG	UU
1492	300	270	240	210	180	150	120	90	60	0

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

	A*A*	AA	BB	CC	DD	EE	FF	GG	UU	Total No. of Cands
UMS	270	240	210	180	150	120	90	60	0	
Cum%	0.8	7.1	19.9	39.4	57.8	72.8	86.3	94.7	100	1278

1278 candidates were entered for aggregation this series

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.

General Certificate of Secondary Education
Applied Manufacturing (Specification Code 1496)
June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
4878	Raw	50	45	40	35	31	25	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4879	Raw	50	44	40	36	32	26	20	15	10	0
	UMS	100	90	80	70	60	50	40	30	20	0
4880	Raw	100	77	66	55	45	39	33	27	21	0
	UMS	100	90	80	70	60	50	40	30	20	0

Specification Aggregation Results

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

	Maximum Mark	A*A*	AA	BB	CC	DD	EE	FF	GG	UU
1496	300	270	240	210	180	150	120	90	60	0

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

	A*A*	AA	BB	CC	DD	EE	FF	GG	UU	Total No. of Cands
UMS	270	240	210	180	150	120	90	60	0	
Cum%	1.0	7.3	23.0	43.6	62.7	76.3	86.9	94.6	100	899

899 candidates were entered for aggregation this series

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

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2008