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

January 2008

1492/1496/MS/R/08J

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)

REPORTS ON THE UNITS

Component	Page
1492 Engineering - Chief Examiner's Report	1
4868 Engineering Written paper	2
1496 Manufacturing - Chief Examiner's Report	7
4880 Manufacturing Written paper	8
Grade Thresholds Engineering	13
Grade Thresholds Manufacturing	14

1492 Engineering - Chief Examiner's Report

Introduction

Centres' understanding of the portfolio assessment criteria and the knowledge and understanding required for the written paper continues to improve. Candidates are now demonstrating sound understanding of Engineering in both contexts.

Written paper

On the whole centres are preparing candidates well for the written paper, evidenced by more gaining higher marks. There are still some general gaps in knowledge, particularly of systems and control, but every question elicited at least one response gaining full marks.

4868 Engineering Written paper

Q1 **(a)** Most candidates answered this part well gaining full marks. Those who did not most frequently had the bicycle as civil engineering.

(b) A small number of candidates gave benefits of the products stated rather than of technology.

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. 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.

Candidates from some centres all appeared to have learned the same product with varying degrees of success, particularly where the product is unfamiliar to the candidates. In one centre, the product incorporated advanced technology, leaving many candidates attempting to recall correct terminology and complex information unsuccessfully.

Surprisingly some candidates left this question blank. They tended to be from centres where candidates chose a wide range of products with varying success. This suggests that they have not had experience of product analysis, which puts them at a significant disadvantage compared with most others.

Q3 Given that most candidates have experience of CAD in their course, it was disappointing that very few gained full marks.

(a) Most candidates correctly gave ease of editing as one benefit.

(b) From their practical experience, it was expected candidates would be conversant with drawing symbols and the categories to which they belong. Very few gained full marks here. Some candidates gave products such as TV as an electronic component.

(c) Most candidates identified e-mail as a suitable method and could describe its use, often in very simple terms (‘click on the paperclip…’)

Q4 **(a)** This question was generally well-answered, with candidates drawing on their own experience.
The most common incorrect responses were about increased space in vehicles. Unexpected but correct answers included alleviating boredom by installing DVD players for rear seat passengers.

(b) Most candidates readily identified the emission of greenhouse gases from vehicle exhausts, but a second example was more challenging. There were some hazy views on bio fuels and electric vehicles.

Q5 Candidates’ knowledge of materials continues to give concern.

(a) Smart materials are an important aspect of the application of technology to engineering. Both thermochromic dye and shape memory alloy have appeared in past papers but despite the clues in their names, few candidates were able to identify the appropriate 'smart' property.

(b) As in previous sessions, many candidates could not identify a composite material and only a very small number could describe the composition of a composite.

(c) Too many candidates responded with a physical property here, perhaps because they had not read the question fully. The most popular correct answers related to aesthetics and cost.

Q6 In the main, this question produced some very disappointing responses. There was a lot of misunderstanding as to the basic function of a PLC as opposed to what they term 'a robot.'

Candidates from two centres responded well to this question, showing familiarity with PLCs. One candidate gave the size of a PLC as a benefit 'because it is about as big as a loaf of bread', which supported the response well.

(b) When faced with the familiar 'robot' many candidates stated benefits rather than factors to be considered. In some cases they were fortunate and gained marks, for example for 'costs in the long term'.

Q7 This question focused on a fully automated process, though credit was given for partly automated processes and for stating steps that were common to both.

It was clear that few candidates had had the opportunity to compare small workshop practice with fully automated processing.

This question proved a good discriminator for candidates who were familiar with the subject.

Q8 Though responses to this question were limited, many candidates gained some marks, mainly from having heard of customized cars and being able to identify a product. Many raised issues without making the link to relevance.
Candidates were not penalized for selecting a product introduced earlier. Though it was disturbing that the car was a popular choice.

(a) For full marks, candidates needed to show clear links between technology and the availability of customised products.
Almost all candidates were able to suggest an appropriate product, though most then gave a material (as in January's paper), some of which could not be considered 'modern technology'. Marks were not awarded for generic materials eg 'plastic'.

(b) For full marks, candidates need to show clear links between the introduction of a named product and its impact on society. The most popular product was the mobile phone and though most candidates could identify some social issues, they struggled to make links between these and the product itself. Candidates were not penalized for selecting a product introduced earlier than 1950, though it was disturbing that the car was a popular choice.

General Comments

Good 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 candidates portfolio was much appreciated as this helped focus the moderator and made the process of approving centres marks much easier.

It was particularly helpful where Centres had made use of a URS form to identify and locate evidence.

Centres should carefully consider 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.

Comments on Individual Questions

Unit 4866 Design and Graphical Communication

Strand a
The majority of candidates produced an initial specification from a given design brief. However there still appears to be confusion between a customer or client and the end user. This prevents candidates from scoring well in strands (a2) and (a3) as evidence of customer involvement and feedback is required.

Good practice saw candidates in (a3) explaining and evaluating how customer feedback and associated information was used. With examples of communication between the candidate and the client included and key points annotated.

Strand b
Candidates generally presented a range of rendered ideas that were suitable solutions to their design brief. Evidence of different drawing techniques was shown in the portfolios. However a lot of the candidate's time was spent labelling or describing ideas rather than justifying the drawing techniques that had been used to develop their final idea.
Good practice showed candidates presenting and evaluating their selected idea with reference to their specification and explaining why the drawing techniques used were appropriate.

Strand c
The majority of candidates identified Health and safety issues. However it is important that candidates select and explain aspects that are relevant to their particular product rather than presenting a log of general workshop health and safety rules and regulations.
Evidence of good practice looked at generic health and safety issues but then developed these so that they were related to the product being presented. On occasion use was made of photographs to show standard procedures.

There was evidence in portfolios of candidates identifying quality control procedures but in many instances the candidate failed to explain how or why procedures would be carried out at each stage of production.

Good practice was evident when the candidate reflected on the product being designed and broke down the production process into stages, allowing quality control procedures to be identified and explained.
Strand c3 was poorly answered with very few candidates considering total quality management

issues. When this aspect was described in portfolios it tended to be dealt with in general terms rather than being specific to the selected design idea.

Strand d
This strand should be considered as a development of strand b with the selected idea being presented to the customer in a variety of ways. Strand d is not an opportunity to present all the work done in the candidate's portfolio as a power point slide show. The emphasis in this section must be the presentation of the final product to the customer.

Strand (d1) was well answered with sketches and diagrams used to present the design solution. However in many cases due to the lack of an appropriate customer/client it was difficult to explain these ideas (d2) and obtain appropriate feedback so that the final solution could be justified.

Strand e
In general candidates have a good understanding of how their product would be made and therefore scored well in (e1).

Production plans were evident for (e2) with stages of making and quality assurance procedures identified. However some of the information presented was limited.

Good practice not only identified issues but explained how and why production methods and quality assurance procedures would be carried out.

Several candidates discussed real world engineering especially in relation to their product.

Unit 4867 Engineered Products

Strand a
This strand (a1) should begin with a description of a simple Engineering process, several candidates failed to do this and evidence commenced with a production plan developed from a given design brief. Marks awarded by these Centres had to be adjusted accordingly with a deduction of marks that had been credited for the missing work.

Production plans that were presented tended to be quite comprehensive, detailing the required engineering processes and quality control issues.

Good practice was seen in Centres where candidates then evaluated their production plans analysing the identified engineering processes and quality control procedures.

Strand b
It is important that candidates address all aspects of strand b when presenting their portfolios. Some candidates failed to describe the importance of accurate production planning and of meeting the product specification.

In general production plans, that were produced as part of strand a, were adapted to include a time schedule. Several candidates presented a second plan in the form of a Gantt chart which indicated a further time schedule.

Good practice saw candidates evaluating their production plan and schedule.

Strand c
It is expected in (c1) that candidates state why health and safety is important. Work presented did give an impression that candidates were conscious of health and safety issues as reference was made to personal protective equipment and risk assessments were carried out but this work needs to be developed with candidates reflecting on the reason why this is important and

relating it to the product being produced.

Good practice showed and explained quality control tests being carried out as well as health and safety rules being followed. With such work presented in the form of an annotated log and supported using photographic evidence.

Strand d
Reference in this strand should be made to the use of ICT, the level of response varied across the Centres. Some candidates did not present any work at all, others explained how ICT could be used in general terms referring to theory knowledge that had been taught rather than personal experiences.

Good practice was shown by candidates who explained and evaluated how they had used ICT to produce their product. Annotated photographic evidence of processes carried out was used to support the explanations of the use of ICT.

Strand e
A good understanding was shown by candidates regarding how the product would be produced. However in some cases candidates did not fully answer strand (e1) as they merely listed the stages that they would go through rather than describing the process, identifying appropriate tools and equipment.

Good practice was shown by candidates who explained in (e2) why tools and equipment were appropriate to the task.

Very few candidates explained changes that were made to the production plan (or why their planning was accurate and no changes were necessary). Candidates who scored highly in this section described how production processes would be changed in order to produce their product in “real world” engineering.

1496 Manufacturing - Chief Examiner's Report

Introduction

Centres' understanding of the portfolio assessment criteria and the knowledge and understanding required for the written paper continues to improve. Candidates are now demonstrating sound understanding of Manufacturing in both contexts.

Written paper

On the whole centres are preparing candidates well for the written paper, evidenced by more gaining higher marks. There are still some general gaps in knowledge, particularly of systems and control, but every question elicited at least one response gaining full marks.

4880 Manufacturing Written paper

Q1 **(a)** Most candidates answered this part well gaining full marks.

(b) A small number of candidates gave benefits of the products stated rather than of technology.

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. 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.

Candidates from some centres all appeared to have learned the same product with varying degrees of success, particularly where the product is unfamiliar to the candidates. In one centre, the product incorporated advanced technology, leaving many candidates attempting to recall correct terminology and complex information unsuccessfully.

Surprisingly some candidates left this question blank. They tended to be from centres where candidates chose a wide range of products with varying success. This suggests that they have not had experience of product analysis, which puts them at a significant disadvantage compared with most others.

Q3 Given that most candidates have experience of CAD in their course, it was disappointing that very few gained full marks.

(a) Most candidates correctly gave ease of editing as one benefit.

(c) Most candidates identified e-mail as a suitable method and could describe its use, often in very simple terms (‘click on the paperclip…’)

(d) Though in (b) most candidates could identify hardware, many could not identify software applications, and unlike email very few succeeded in describing its use. Perhaps email is much more widely used by candidates than other applications.

Q4 **(a)** This question was generally well-answered, with candidates drawing on their own experience.

The most common incorrect responses were about increased space in vehicles. Unexpected but correct answers included alleviating boredom by installing DVD players for rear seat passengers.

(b) Most candidates readily identified the emission of greenhouse gases from vehicle exhausts, but a second example was more challenging. There were some hazy views on bio fuels and electric vehicles.

Q5 Candidates’ knowledge of materials continues to give concern.

(a) Modern and smart materials are an important aspect of the application of technology to manufacturing. The most popular choices of material were thermochromic dye and shape memory alloy which have appeared in past papers but, despite the clues in their names, few candidates were able to identify the appropriate 'smart' property.

(b) As in previous sessions, many candidates could not identify a composite material. Of those who could, most gained at least one mark by describing its properties broadly.

Q6 In the main, this question produced some very disappointing responses. There was a lot of misunderstanding as to the basic function of a PLC as opposed to what they term 'a robot.'

Candidates from two centres responded well to this question, showing familiarity with PLCs. One candidate gave the size of a PLC as a benefit 'because it is about as big as a loaf of bread', which supported the response well.

(b) When faced with the familiar 'robot' many candidates stated benefits rather than factors to be considered. In some cases they were fortunate and gained marks, for example for 'costs in the long term'.

Q7 This question was similar to one from a sample paper, and differentiated well at the higher level, allowing candidates to show analytical skills in applying knowledge. Most candidates gained some marks. Some attempted to deduce answers rather than drawing on their knowledge and study of manufacturing. It was disappointing that many candidates were unable to identify examples of products produced by various methods.

Q8 Though responses to this question were limited, many candidates gained some marks, mainly from having heard of customized cars and being able to identify a product. Many raised issues without making the link to relevance.

(a) For full marks, candidates needed to show clear links between **technology** and the **availability** of **customised** products.

Almost all candidates were able to suggest an appropriate product, though most then gave a material (as in January's paper), some of which could not be considered 'modern technology'. Marks were not awarded for generic materials eg 'plastic'.

(b) For full marks, candidates need to show clear links between the **introduction** of a named **product** and its **impact on society**. The most popular product was the mobile phone and though most candidates could identify some social issues, most struggled to make links between these and the product itself. Candidates were not penalized for selecting a product introduced earlier than 1950, though it was disturbing that the car was a popular choice.

General Comments

Good practice was shown by Centres who used A3 or A4 presentation folders and placed candidates' sheets in individual plastic wallets. Problems occurred when centres presented work as individual sheets which had not been bound or tagged.

It was particularly helpful where Centres had completed the URS form to identify and locate evidence. Evidence of good practice made use of a system to indicate pages such as numbering or when the work was presented in sections which represent the 5 strands.

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. Good practice used photographic evidence to show the batch of items produced.

Comments on Individual Questions

Unit 4878 Designing Products to Manufacture

Strand a
The majority of candidates managed to produce an initial specification from a given design brief. Some candidates are still having problems distinguishing between a client and the end user. The intention of this unit is that the candidate should be working as a designer following a design brief issued by a client.

Once the initial specification is presented candidates should then gather a range of associated information. This aspect of the portfolio needs careful management with time spent gathering only relevant information.

In strand (a2) a revised specification was generally presented but this area tended to lack the involvement of the client and far too often decisions were made by reference to surveys that had been carried out with end users. Few candidates developed their work into strand (a3) by justifying their final design specification.

Good practice showed candidates discussing their research findings with the client then presenting and evaluating a revised specification.

Strand b
The vast majority of candidates presented a range of ideas in Strand (b1). The explanation of the ideas presented should focus on the design specification, far too often candidates tend to ignore the specification and make use of single words as a form of labelling rather than describing and comparing their initial thoughts. Once a thorough analysis of ideas has taken place a final idea should be developed and explained.

Good practice showed a final developed idea that was evaluated with design decisions justified.

Strand c
Candidates recognised the need to identify health and safety issues. It is important that aspects highlighted are relevant to the candidates' work and not just general health and safety issues.

Quality control issues were identified by a lot of candidates but many failed to develop this aspect and did not give enough detail as to how they would be carried out or why they were necessary.

Very few candidates covered the topic of total quality management. When it was attempted a description was included in general terms rather than relating to how the designed product would be checked using a variety of procedures.

Strand d
This strand is separate to strand b and work presented here should be a development of the final idea selected in the earlier strand. Candidates are encouraged to present ideas to the client and power point is a useful tool to use. However the presentation should be directed at "selling" the final product and not be a slide show of the contents of the candidate's portfolio. Good practice used a variety of methods to present ideas in strand (d1), including coloured sketches, 3D and working drawings. The use of CAD was also evident. In strands (d2) and (d3) candidates benefited from involving their client as this allowed ideas to be explained and justified. It also gave the candidate the opportunity to gain valuable feedback.

Strand e
Candidates managed to identify manufacturing processes that would be used to produce their designed product. However explanations in strand e1 must consider how the product would be made in quantity.

Quality assurance processes that would be carried out when manufacturing the product should be highlighted in e2.

Good practice saw candidates making use of a table to present their work with appropriate column headings to allow the stages of making and quality checks to be shown. Such work included annotated photographic evidence to help describe the processes and show quality checks being carried out.

Real world manufacturing was identified by better candidates however this work must be relevant to the selected product and not a summary of industrial production in general.

Unit 4879 Manufactured Products

Strand a
Candidates should begin this unit by describing a simple manufacturing process; several did not and commenced their work with a production plan derived from a given design brief. Therefore marks had to be adjusted accordingly, as some of these Centres had given credit for the missing work.

Production plans were presented and these tended to be quite comprehensive, detailing the required manufacturing processes and quality control issues.

Good practice saw candidates evaluating their production plan and making reference to manufacturing processes and quality control procedures.

Strand b
Good practice in b1 saw candidates using two separate paragraphs to describe the importance of accurate production planning and then stating the importance of meeting the product specification. Several candidates failed to make reference to these points in b1 and therefore marks had to be adjusted accordingly.

Production plans, that were produced as part of strand a, usually had time schedules included and identified the roles of different members of the team. Several candidates also presented a second plan in the form of a Gantt chart.

Good practice saw candidates who had evaluated their production plan detailing how it could be improved, and raising points that would allow this to happen. These candidates also reflected on the production schedule, stating how well it had worked, or justifying possible changes.

Strand c
Candidates do include health & safety and quality control issues in their portfolios but as in past examinations these tend to be in general terms. The requirements of (c1) expect candidates to describe the importance of health and safety issues, sometimes such a description was missing. Evidence of health and safety issues and quality control procedures are normally covered in production plans. Good practice not only identifies such procedures but explains how they would be carried out. Photographs can be used to help highlight key points and evidence procedures being undertaken.

Strand (c3), when attempted, tends to be covered in general terms especially the topic of total quality management. A description of total quality management is a good starting point but this needs to be developed in order to consider the implications on the job being produced.

Strand d
In this session it was evident that candidates are considering the effects of good teamwork. However to score well in d1 it is important that the points are explained rather than just being presented as a list. Team roles appear in many folders with good practice being shown by candidates who reflect on why particular roles were allocated.

Strand (d3) continues to be poorly attempted, with some candidates totally ignoring the section, especially the aspect which requires them to reflect on improvements to the manufacturing process as a result of buying in components.

Strand e
Candidates present information as to how they produced their product using a variety of forms, including logs, tables and written summaries. Good practice made use of annotated photographic evidence to show candidate activity.

Tools and equipment were mentioned, but several candidates failed to develop this point and explain why the items were appropriate. Many candidates also failed to record changes that were made during the production of the items. There was limited evidence in the candidates' folders to show the batch of items that had been produced.

Real world manufacturing did feature in some candidates' portfolios but this aspect does need to be developed. Far too often this topic was covered in general terms and not specifically to the batch of items produced.

Grade Thresholds Engineering

General Certificate of Secondary Education
Engineering (Specification Code 1492)
January 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	24	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4867	Raw	50	45	40	35	31	25	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4868	Raw	100	74	65	56	47	41	35	29	23	0
	UMS	100	90	80	70	60	50	40	30	20	0
	Raw										
	UMS										
	Raw										
	UMS										
	Raw										
	UMS										

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

	Maximum Mark	A*	A	B	C	D	E	F	G	U

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%	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	2

2 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.

Grade Thresholds Manufacturing

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

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
4878	Raw	50	45	40	35	30	24	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4879	Raw	50	45	40	35	30	24	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4880	Raw	100	83	71	59	48	42	36	30	24	0
	UMS	100	90	80	70	60	50	40	30	20	0
	Raw										
	UMS										
	Raw										
	UMS										
	Raw										
	UMS										

Specification Aggregation Results

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

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

	Maximum Mark	A*	A	B	C	D	E	F	G	U

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%	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	1

1 candidate was 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