

**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 2009

1492/1496/MS/R/09J

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

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4866 Design and Graphical Communication & 4867 Engineered Products

General Comments

Good practice was shown by Centres who used A3 or A4 presentation folders and placed candidate's sheets in individual plastic wallets.

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.

Unit 4866 Design and Graphical Communication

Strand a

The majority of candidates produced an initial specification from a given design brief. However in some cases a brief had been allocated to candidates from the teacher and there was no client involvement. This disadvantages candidates as they are prevented 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. Many candidates failed to make any reference to drawing techniques used.

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 developing these so that they were related to the product being presented.

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. On occasion some centres used the evidence presented in strand c as a way of gaining further marks in this strand. When this happened marks had to be adjusted as it is important that work in strands c and e are separate and the later strand should show progression from that produced at an earlier stage. 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 is given 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.

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.

In strand D it is important that candidates explain how ICT was used to produce their work and not just to design the work. On several occasions candidates explained how they had used CAD but no reference was made to production using CAM.

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).

Several candidates failed to make reference to “real world” engineering and therefore limited the amount of marks that could be awarded in strand (e3). Candidates who scored highly in this section described how production processes would be changed in order to produce their product in “real world” engineering.

4868 Engineering Written paper

General Comments

A small number of candidates entered this session and in general the standard of their responses was disappointing.

Comments on Individual Questions

Question 1

Most candidates answered this question well, with many gaining full marks in parts (a) and (c). In part (b), marks were lost by candidates stating different products from those given.

Question 2

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 and to some extent mp3 players. 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.

Question 3

To gain two marks in parts of (a) where they were required to 'describe', candidates needed to expand on a simple statement, for example by giving an activity, or method.

- (b) Candidates' knowledge of standard drawings has improved and many gained two of the three marks available. Most often, identifying an audience proved a challenge.
- (c) Few candidates showed they knew what was meant by a standard symbol, even fewer gave a benefit.

Question 4

- (a) This familiar question, presented as a table, was generally well-answered. Few candidates gave inappropriate or no products. A small number of candidates gave materials rather than examples of technology, where these were modern materials (the mark was awarded).
- (b) Very few candidates showed understanding of sustainability in their responses.

Question 5

Again candidates showed more knowledge of engineering materials than in previous sessions. A disturbing number identified aluminium as a ferrous alloy and gave vague general benefits of alloys such as 'strong'.

Question 6

Most candidates attempted this question, showing knowledge of the issues related to robotics, though some responses were limited to generalisations. Part (b) where they were required to describe **how** benefits are achieved proved more challenging to most candidates who tended to give a reworded or exemplified description of the benefit.

Question 7

There were some good responses to this question, with candidates drawing on their practical experience, rather than describing the processes and checks involved.

Question 8

Though responses to this question were limited, many candidates gained some marks for making relevant points and giving an example. Few presented a discussion or even developed a point. Most were well short of demonstrating depth of subject knowledge, as expected in this question, aimed at higher achieving candidates.

4878 Designing Products to Manufacture & 4879 Manufactured Products

General Comments

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.

Several Centres failed to follow expected procedures presenting only marks on a MS1, time was therefore wasted by having to request CSF forms to be forwarded before moderation could be carried out.

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.

Unit 4878 Designing Products to Manufacture

Strand a

The majority of candidates managed to produce an initial specification from a given design brief. Once the initial specification is presented the majority of candidates did successfully carry out a range of research in order to gain information to support their study.

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, rather than incorporating other relevant information that was gained during the research process. 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. On far too many occasions a final idea was presented without reference to the specification. Some candidates used a tick chart as basic review of ideas when designs were numbered and they were given a star rating against key specification points, however the work regularly stopped at this point and no or limited conclusions were evident in the folder.

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 by 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. On several occasions candidates commenced their work with a production plan derived from a given design brief and it was presumed that the content of the folder would fulfil the requirements of strand a1.

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 one or both of these points however they were allocated full marks 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 raised points, which would allow this to happen. These candidates also reflected on the production schedule stating how well it had worked or justified 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 order to achieve maximum marks in d1 it is important that key teamwork points are fully 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 candidate's 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 specific to the batch of items produced.

4880 Application of Technology Written paper

General Comments

A small number of candidates entered this session and in general the standard of their responses was disappointing.

Comments on Individual Questions

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Grade Thresholds Engineering

General Certificate of Secondary Education
Engineering (Specification Code 1492)
January 2009 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	77	69	61	54	48	43	38	33	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	10	20	40	60	60	100	100	100	6

6 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 2009 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	72	62	52	43	38	33	29	25	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	AA**	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%	0	0	0	0	0	0	0	0	0	0

0 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.

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