

Report on the Units

June 2009

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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 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.

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OCR Level 2 Principal Learning in Engineering H810

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Chief Examiner's Report

Introduction

This is the first year of assessment for the Principal Learning units within the Diploma in Engineering and I am pleased to report the process worked well.

The opportunities for presenters to attend INSET, to use the excellent support materials provided and make their views known on delivery and assessment has helped the development of many of the units within the scheme. Learners clearly benefited from the experiences of centre staff that had attended training sessions. All presenters are encouraged to attend the available training both get ready and get started.

Centres are to be congratulated on their efficient administration and prompt delivery of coursework. All centres submitted the Attendance Register, Centre Authentication Form CCS 160 and examination papers correctly filled in and on time

There is evidence that some centres are becoming systematic in their approach to this diploma, centres should consider the complete learning experience when designing programmes. This is particularly important in relation to learners studying part time alongside real work commitments where they may bring with them a wealth of experience that should be utilised to maximum effect by presenters.

With regard to the units that involved a viva-voce it was a pleasure to observe, some well presented and clearly presented oral solutions to the questions from candidates who had clearly developed a sound understanding of the principles and techniques required for this type of novel assessment.

When there are a number of centres in a consortium it is essential that an internal standardisation system is implemented. This would ensure consistent assessment decisions and is a key to good practice. From a rank order point of view this internal standardisation is essential

Individual Units

F549 Engineering design – Higher (Centre marked/OCR Moderated)

- Learners need to be encouraged to present their work in clearly defined chapters/sections relating to the assessment criteria
- All learners selected and dismantled a desk lamp which was recommended in the model assignment but a number of learners did not fully identify the key functional criteria used in the lamps design and did not therefore establish the strengths and weaknesses of the design
- A number of learners did not produce an in-detail alternative/improved design for a desk lamp and did not justify their design specification for what was supposed to be an improved product
- The use of presentation techniques was very limited with much more work was needed on various styles of drawings, digital evidence and the use of 2D and 3D modelling
- Much more detail was needed about the development of tests that would have proved the developed design

F552 Construct electronic and electrical systems – Higher (Centre marked/OCR Moderated)

- It was evident that candidates found navigation through the workbook straight forward.
- All candidates were able to complete all sections of the Design Challenge within the time allowed.
- It should be noted that marks should be put in the mark boxes at the end of each task and be entered in ink not pencil.
- From the work submitted it was evident that candidates had undertaken a number of teaching and learning activities to develop their knowledge and understanding of electronic and electrical systems prior to undertaking the Design Challenge. Centres are to be congratulated on this.
- Photographic evidence was adequate in all cases but centres must ensure they are securely glued into their workbooks.
- Photographs must be annotated to allow candidates to gain full credit.
- Every centre used the Land-rover Warning Design Challenge and all candidates were able to design working solutions to this.
- Centres are permitted to devise their own Design Challenge and more than one Design Challenge if appropriate. This could be useful where centre/consortium have wide ability ranges.
- Based on the evidence of the prototypes and final solutions all centres were able to provide candidates with access to a full range of components and equipment.

F554 Maintenance – Higher (Centre marked/OCR Moderated)

- All candidates entered for this module chose to use the Model Assignment based on the maintenance of “off road” cycles.
- This choice gave the candidates easy access to a product they were all familiar with and one which allowed for the tasks to be undertaken in the centre.
- Candidates are to be congratulated on the quality of their presentations and it was obvious from these that it was a well received unit.
- There is scope for centre/candidates to choose their own product to maintain but this option was not taken up by any centres.
- Choosing your own product to maintain gives the opportunity for centres to tailor schemes of work to their own facilities, strengths and ability levels.
- Centres are reminded that they can use more than one product for their candidates to maintain which could be useful where centres/consortiums have wide ability ranges.
- For example some candidates could maintain a child’s single speed cycle and some could maintain a sophisticated mountain bike with multiple gears and suspension.
- All candidates chose a different product to examine for task two as required.
- Centres found it difficult to find suitable data for their candidates to use in task two. To overcome this they devised their product data for their candidates to use which is quite acceptable.

F548 The engineered world

General Comments

It was a pleasure to observe some well presented and clearly presented oral solutions to the questions from candidates who had clearly developed a sound understanding of the principles and techniques required for this type of novel assessment.

All centres submitted the Attendance Register, Centre Authentication Form CCS 160 and examination papers correctly filled in and on time

The following points need to be considered:

- A number of centres did not provide a quiet enough room in which to conduct the viva-voce
- The presenter must not stop the candidate from speaking to give them time to write comments in the booklet. i.e. keep the written comments to an absolute minimum
- The presenter may ask for further clarification if the learner's initial utterance is ambiguous, incomplete or too inaccurate. However, in some cases the prompt included statements that gave the learner clues to enable them to answer a question correctly. This type of prompting is out of order
- The presenter must read out the exact question and not change any of the words or meanings because there must be consistency for every candidate
- For the viva-voce learners may take into the preparation room and examination room a work book that has been compiled for use during the viva-voce. The learner can refer to the work book but must not be allowed to read out prepared material during the viva-voce. In a few case reading did take place, this must not be encouraged in future years
- A number of candidates spent a lot of time flicking forwards and backwards through their booklet. It is suggested that a contents page with page numbers is placed at the front of their booklet. This should assist candidates in finding information that they want in order to answer a question
- In future years it would be useful to the markers if the candidate could have in front of them a piece of card with their candidate number printed on it
- Centres sending evidence on incorrect formats other than compact disc and not keeping a back up copy caused delay the marking process. Please note that compact discs or digitally submitted evidence will not be returned to the centre.
- Presenters are reminded that during the recording of the viva-voce it is in order for them to go back over questions if there is time available
- **Please ensure that when saving files to disc the candidate name and number are included in the file name**

Comments on Individual Questions:

Question One

- (a) Please identify the engineering achievement that you have researched.
- (b) Explain the social effects which have resulted from this engineering achievement.

All candidates correctly identified an engineering achievement that they had researched. High scoring candidates included several correct clear and logical examples of the social effects that had resulted from this chosen achievement. Weaker candidates gave a limited explanation of a single social effect.

Question two

Please tell me about the political issues which may have driven the development of the engineering achievement you have researched.

A very low scoring question. The majority of candidates could not talk about the political issues that had driven the development of the engineering achievement that they had chosen. It is suggested that centre's read the unit specification assessment criteria 1.4. This states "Identify and assess the social, human, economic and political issues that drove the achievement". To obtain high marks the candidate needed to include logical and relevant supporting evidence that demonstrated depth and breadth of knowledge regarding political issues.

Question three

Please explain the merits of professional body membership associated with different engineering professions.

The answers for this question ranged from good to poor. The good candidates correctly explained the merits of professional body membership associated with an engineering profession and included logical and relevant supporting evidence. The weaker candidates had no idea of the membership merits of a professional body and had no idea of what a professional body was.

Question four

- (a) Now, please tell me which engineering sectors you have studied.
- (b) Now, for one of these sectors you have studied, please tell me about the basic duties and responsibilities of a craft person.

All candidates correctly identified a number of engineering sectors that they had studied. Higher marks could have been obtained by most candidates if they had given a response that involved depth and breadth about a craft person including logical and relevant supporting evidence. It was obvious that the weaker candidates had no idea of the job role of a craft person when they started talking about design engineers.

Question five

Now, please explain the impact of sustainability on resources and the way engineering considers conservation issues.

The answers for this question ranged from good to poor. The weaker candidate did not really understand the term sustainability and had little idea of how sustainability impacted on resources and conservation issues. The good candidate received marks for identifying an impact of sustainability on resources and for a response which included logical and relevant supporting examples of how engineering considers conservation issues.

Question six

Generally well answered by all candidates. Most candidates treated the question in two parts. They dealt with the responsibilities of the employee and the responsibilities of the employer as two separate lists. Logical and relevant examples were given by most candidates. Most candidates could have made more reference to the legal responsibilities of the employee and employer.

F549 Engineering Design

General Comments

It would aid the candidates if they presented their work in clearly defined chapters/sections relating to assessment criteria.

Marks must be entered in ink pen not pencil.

All candidates chose to use the example given in the model assignment as their chosen product to study.

This model assignment allows for easy access to a suitable product to both disassemble and compare strengths and weaknesses.

There is scope within the tasks for centres/candidates to chose their own product and devise their own design brief but the opportunity to do this was not taken by any centre.

Developing your own design brief gives centres/candidates the ability to tailor schemes of work to their particular facilities, specialisms and abilities.

Most candidates chose to improve the aesthetics of a desk lamp which did limit them in the range of communication techniques they could use.

Choosing the more functional aspects of a desk lamp to study would allow candidates to investigate mechanisms, electrical/electronic circuits and/or structures. This would give candidates access to a much wider range of possible communication and modelling techniques such as circuit diagrams, flow diagrams, overlays, 2D and 3D mechanical models, structural diagrams/models etc. etc.

Comments on Individual Questions

Assessment Criteria 1 – Disassembly and strengths and weaknesses.

It would be helpful if candidates presented their key criteria in sections ie needs of the user and needs of the manufacturer.

It is important that candidates disassemble their chosen product in real time and support this with photographic evidence.

Very few candidates described in detail the manufacturing processes involved in making the desk lamp. Without this they cannot access the higher mark band.

Strengths and weaknesses comparison of similar products was lacking in the majority of work presented.

A useful method of presenting their analysis of strengths and weaknesses of their product and comparison to a range of similar products is in chart form.

Meaningful and objective conclusions must be drawn from this comparison if the higher mark band is to be accessed.

Assessment Criteria 2 – Legislation.

Most candidates gave a limited response to legislation stating only the more obvious issues.

Photographs of labels showing CE and Kite Marks were as far as many candidates went in showing an understanding of legislation.

To access the higher mark band candidates must show a detailed understanding of the implications of the standards relevant to their selected product

From this understanding candidates should draw conclusions as to the implications for their chosen product. This could include reference to the risk from burning, electrocution, earthing, toxic materials etc.

Assessment Criteria 3 – Design brief and specification.

Most design briefs were very simplistic with candidates making statements such as “I am going to improve the lamp shade” and “I am going to add a component”. Neither of these go on to explain in which way or what component and why.

Design briefs should relate to an improvement which candidates have identified is needed in their disassembly of the product.

This should then lead on to a detailed and justified specification listing all the aspects needed to improve the product and why.

Many specifications were too generic and lacked justification.

Assessment Criteria 4 – Communication techniques.

To access the higher level mark band candidates should independently select the most appropriate communication techniques. There must be evidence of this in their work and this could take the form of a chart of techniques giving uses and advantages.

A range of communication techniques was lacking in most candidates work. The desk lamp allows for such as circuit diagrams, exploded views as well as the more obvious communication technique.

A wide range of presentation styles and techniques should include sketching, orthographic projections, isometric projections, exploded views, circuit diagrams, CAD and 2D and 3D modelling.

In many cases drawings lacked clarity and accuracy which is essential for candidates to gain the higher band marks.

Assessment Criteria 5 - Testing.

Tests should be done in real time with photographic evidence supporting this.

Questionnaires and subjective surveys do not give candidates the opportunity to do scientific tests and mathematical analysis. This denies them access to the higher level mark band.

A good way of ensuring these are covered could be to use some of the tests outlined in Unit 545 Introduction to Engineering Materials.

Few candidates produced clear meaningful conclusions from their test results.

F552 Design Challenge

General Comments

It was evident that candidates found navigation through the workbook straight forward. All candidates were able to complete all sections of the Design Challenge within the time allowed.

It should be noted that marks should be put in the mark boxes at the end of each task and be entered in ink not pencil.

From the work submitted it was evident that candidates had undertaken a number of teaching and learning activities to develop their knowledge and understanding of electronic and electrical systems prior to undertaking the Design Challenge. Centres are to be congratulated on this. Photographic evidence was adequate in all cases but centres must ensure they are securely glued into their workbooks.

Photographs must be annotated to allow candidates to gain full credit.

Every centre used the Landrover Warning Design Challenge and all candidates were able to design working solutions to this.

Centres are reminded that they are permitted to devise their own Design Challenge.

It is even permitted for centres to present more than one Design Challenge. This could be useful where centre/consortium have wide ability ranges.

Based on the evidence of the prototypes and final solutions all centres were able to provide candidates with access to a full range of components and equipment.

Comments on Individual Questions

Assessment Criteria 1 – Electronic and electrical principles.

In response to the Design Challenge all candidates were able to apply their knowledge of electronic and electrical principles to propose possible Input/Control and Output components for the design of their circuit to varying degrees of sophistication.

Candidates are reminded that they need to identify safe working procedures for tools, equipment and manufacturing processes. These should be appropriate to their selected proposed circuit.

Most candidates were able to describe generic safe working procedures but failed to consider the needs of others and of giving specific details in their workbook.

Candidates are expected to indicate the safe use of manually operated tools.

Assessment Criteria 2 – Operating principles.

All candidates were able to describe the properties of at least three components but a larger range is required to gain access to the higher band marks.

More able candidates were able to justify their selection based upon their properties.

Candidates are reminded that they need to use calculations to independently identify and select component values. They also need to justify their selection of component values and component types.

All candidates were able to produce an initial circuit diagram some to varying levels of sophistication.

Assessment Criteria 3 – Circuit Construction.

It was encouraging to see all candidates using a range of prototyping techniques to develop their final solution.

It was evident that centres supplied their candidates with a full range of tools, components and equipment to allow them successfully to complete this task.

Report on the Units taken in June 2009

The use of circuit design software was evident in many candidates work and this should be encouraged.

Producing the PCB between tasks did not seem to cause any problems for centres.

Centres are reminded of the importance of taking good quality photographs throughout both these tasks.

There is the provision for candidates to stick extra photographs to support these tasks at the back of the workbook.

Candidates are to be congratulated on the quality of their final outcomes in most cases.

Assessment Criteria 4 – Testing and fault finding.

Candidates were supplied with a suitable range of test equipment which they used with varying degrees of success.

Most were able to devise a simple test to confirm the device measured /showed tilt.

The use of complex calculations to predict circuit test data was lacking in the majority of candidates work.

Most candidates were unable to use their test results to identify circuit modifications to enable correct operation.

Most were also unable to use complex calculations to prove the use of alternative components. The majority also failed to suggest circuit change based on their data findings.

F554 Maintenance

General Comments

All candidates entered for this module chose to use the Model Assignment based on the maintenance of “off road” cycles.

This choice gave the candidates easy access to a product they were all familiar with and one which allowed for the tasks to be undertaken in the centre.

All the candidates need to be congratulated on the quality of their presentations and it was obvious from these that it was a well received unit.

There is scope for centre /candidates to choose their own product to maintain but this option was not taken up by any centres.

Choosing your own product to maintain gives the opportunity for centres to tailor schemes of work to their own facilities, specialisms and ability levels.

Centres are reminded that they can use more than one product for their candidates to maintain which could be useful where centres/consortiums have wide ability ranges.

For example some candidates could maintain a child’s single speed cycle and some could maintain a sophisticated mountain bike with multiple gears and suspension.

All candidates chose a different product to examine for task two as required.

Centres found it difficult to find suitable data for their candidates to use in task two. To overcome this they devised their product data for their candidates to use which is quite acceptable.

Comments on Individual Questions

Assessment Criteria 1 – Maintenance Procedures.

To gain marks in the higher band candidates must independently select information from manufacturers and prioritise what is needed.

Candidates must undertake complex routine maintenance procedures such as on bearings, cranks and gear systems to gain marks in the higher band.

There should be evidence of candidates using tools and equipment safely this could be in the form of annotated photographs or a written statement describing this.

There should be clear evidence of candidates using appropriate tools and equipment effectively. Most centres verified this with photographic evidence.

The majority of candidates chose to produce a maintenance manual as evidence of how they devised procedures for an engineered product. This proved a very effective method of demonstrating this requirement.

An area that does need to be addressed by most candidates is the requirement to modify and re-test where necessary.

Assessment Criteria 2 – Nature of Failure.

As model assignment focussed on a specialist supplier of “off road” cycles it was difficult for candidates to choose a different product from the company to study.

This was overcome by candidates choosing a product from the automotive field which is a logical step from cycles. This was quite acceptable.

Most candidates were able to give detailed information on the nature of failure and what caused it. However to gain marks in the higher band they also needed to consider both the implications and impact of this on both the user and manufacturer.

Assessment Criteria 3 – Failure Trends.

Centres found it difficult to access suitable data for their candidates to use to analyse failure trends. To overcome this centres devised their own statistics and data for candidates to use and this was quite acceptable.

Motor and plant manufacturers could be a good source of this information.

Most candidates chose to present their findings as a simple statement. The use of graphs and charts would be a more appropriate method of presenting this information.

Few candidates went on to include a planned maintenance schedule in their findings.

Grade Thresholds

OCR Level 2 Principal Learning in Engineering H810
June 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	U
F548	Raw	60	48	36	24	12	0
	Points	10	8	6	4	2	0
F549	Raw	60	48	36	24	12	0
	Points	10	8	6	4	2	0
F552	Raw	30	24	18	12	6	0
	Points	5	4	3	2	1	0
F554	Raw	30	24	18	12	6	0
	Points	5	4	3	2	1	0

Specification Aggregation Results

No learners aggregated this series. Aggregation is not available for this specification until June 2010.

For additional guidance on the points awarding system, please refer to the Admin Guide for Diplomas at:

<http://www.ocr.org.uk/administration/documents.html?section=general>

Statistics are correct at the time of publication.

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