RECOGNISING ACHIEVEMENT

Principal Learning

Engineering

OCR Level 3 Principal Learning **H811**

Examiners' Reports

June 2011

H811/R/11

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

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

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Principal Learning

OCR Level 3 Principal Learning in Engineering (H811)

EXAMINERS' REPORTS

Chief Examiner's Report

General Introduction

This is the third year of assessment, with this being the fifth award for the Principal Learning units within the Diploma in Engineering. There are nine units at level three and all have been assessed.

The opportunities for presenters to attend INSET, to use the excellent support materials provided and make their views known on the delivery and assessment of units has helped the development of many of the units within the scheme. All presenters are encouraged to attend one of a number of opportunities that are available for training.

Centres are to be congratulated on their efficient administration and prompt delivery of paperwork and compact discs. Most 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. With this systematic approach in mind centres should consider the learners' complete learning experience when designing learning 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.

When a disc is being submitted more attention needs to be paid to the labelling of files. In future each learners file must be named according to the following instructions:
Centre number_Candidate number_Unit number_Series.

F556 Engineering business and the environment

This unit was marked by centres and moderated by OCR.

Most learners presented work in a neat and tidy fashion but the use of a contents list with page numbers is to be encouraged.

A high proportion of learners used a local engineering business as their model for covering this unit. This practice is to be encouraged.

Assessment Criteria 1

The majority of learners were able to give an adequate description of the internal structure of a typical business, and did identify different roles within the organisation. Some additional supporting evidence on possible career pathways through the business studied would have been advantageous.

There were some good responses in relation to internal and external factors affecting business operations of their chosen studies along with a brief analysis of risks associated with running both small and large businesses.

Assessment Criteria 2

The majority of learners presented a good overall submission dealing with the roles of a project management team and outlined the typical responsibilities of the individual members of the team. The concept of 'good time management' within the team was well understood with viable examples being given.

Assessment Criteria 3

These sections were particularly well covered, with learners giving valid reasons and explanations regarding the environmental issues related to business in respect of controlling contamination of air and water, and controls to reduce solid and liquid waste materials.

Assessment Criteria 4

Learners provided sound judgements on the possible effects regarding external environmental factors and how they are managed within a typical business organisation.

Assessment Criteria 5

All learners undertook a simple chemical analysis using local environmental samples and presented their findings in a clear and logical format.

F557 Application of computer aided designing

This unit was marked by centres and moderated by OCR.

The following points need to be considered:

- Centre staff could make more comments on the Unit Recording Sheet in the teacher comments panel provided. The column headed 'Page' also needs to be completed.
- Most learners presented work in a neat and tidy fashion but the use of a contents list with page numbers is to be encouraged.
- It is anticipated that learners will work on the production of a range of 2D and 3D CAD models of design ideas. It is possible that work undertaken at Level 2 could be further enhanced using the learner's own brief and specification from previous units.
- If the Level 2 work is not followed through then learners will need to produce a design brief and specification even though there are no marks for this.
- Models could be produced using reverse engineering techniques from existing products incorporating standard components. This approach could enhance the presentation of the technical work required for the product study in Unit F558: Selection and application of engineering materials.
- It is recommended that one model should be the result of concurrent engineering methods.
- The results of testing could be recorded in short reports with screen shot animation or video sequences. Evidence could also include the use of digital photography taken in real time as activities occur.

Assessment Criteria 1

Learners should use 2D and 3D software packages to design and model simple engineered products. Examples of such packages are: TechSoft 2D Design, AutoCAD, ProDesktop, SolidWorks and AutoDesk Inventor

Parts may include solid objects, castings, engineering components, moulds, formers and folded sheet components.

Learners should be encouraged to use components of existing products as a basis for CAD modelling, scanning and reverse engineering – consumer products, engineering components, jewellery, historical artefacts.

Learners should incorporate standard components in assemblies of parts – fastenings, nuts, bolts, screws, gears, pulleys, racks; electrical and pneumatic components.

Assessment Criteria 2

In some cases learners needed to give more detail when producing drawings to British and International standards including the creation of orthographic and pictorial views of parts and assemblies. More care needed to be taken when learners used dimension lines, stated tolerances and presented appropriate cross-sectional views.

Assessment Criteria 3

In some cases more detail was needed when learners produced, modified and stored drawings of the product. Use was made of colour, rendered, textured, exploded, sectioned and annotated views. More learners could have created temporary cross sections or translucency to view interior details.

There could have been more views of parts enhanced by photorealistic material rendering with the addition of background images and additional graphics relevant to the designed product.

Assessment Criteria 4

More detail was needed when learners used physical tests or computer generated tests to examine load bearing characteristics of a component part for modifications dealing with sharp/round edges, square/round holes and with/without stiffening ribs.

Learners could have given more detail of how they manufactured a prototype in foam or wax to evaluate ergonomics. Not much evidence was provided for simulation motion in parts and assemblies and how the use of animation was carried out to explain the workings of mechanisms. Much more evidence could have been provided by the use screen shots, digital photographs, animations and video sequence.

Assessment Criteria 5

To gain higher marks it was necessary for learners to give more detail regarding the research that was carried out to identify and evaluate the application of CAD/CAM within combined design/manufacturing systems. Visiting speakers and industrial visits are to be encouraged.

Assessment Criteria 6

More detail was needed when planning and carrying out research to evaluate the applications of concurrent engineering systems.

F558 Selection and application of materials

This unit was marked by centres and moderated by OCR.

The following points need to be considered:

- Centre staff should make more comments on the Unit Recording Sheet in the teacher comments panel provided. The column headed 'Page' also needs to be completed.
- Most learners presented work in a neat and tidy fashion but the use of a contents list with page numbers is to be encouraged.
- Some use was made of photographs. This and other similar types of media are to be encouraged together with more use of ICT.
- It is recommended that for some learners they might find it useful to divide their folders into sections that follow the assessment criteria. Detailed information can then be found in the specification for each section. It also ensures that all sections are covered
- A number of folders followed the same type of presentation with a similar use of some material. In general terms, the centre should be empowering learners to take charge of their own learning and development.
- In some cases, learners need to be shown how to interpret more carefully the evidence requirements for each mark band.
- Presenters and markers are reminded that progression across the bands is characterised by (i) increasing breadth and depth of understanding (ii) increasing coherence, evaluation and analysis (iii) increasing independence and originality.

Assessment Criteria 1

Learners carried out research into atomic structures, amount of bonding, periodicity and classification and classification of engineering materials in a limited manner. More detail was needed regarding an in depth analysis and evaluation of materials and how a material was selected for a particular application.

Assessment Criteria 2

Learners investigated thermal equilibrium diagrams for a selection of alloys but more detail was needed when drawing conclusions from their findings. A range of materials were used for destructive and non-destructive testing. More detail was needed when carrying out an in depth analysis and evaluation of the testing procedures.

Assessment Criteria 3

Learners investigated the effects of different processing methods by testing and analysing a range of materials in a limited manner. More detail was needed when testing and analysing samples of the processing methods and the subsequent action that was taken.

Assessment Criteria 4

Learners investigated safety factors and modes of failure within a range of materials in a limited manner. Examples of failures were identified but more detail was needed in the explanation of the measures taken by a design engineer to anticipate, minimize and manage risks.

Assessment Criteria 5

More care needs to be taken in the selection of a product. The product must be made from a wide range of engineering materials. In some cases a list of materials needed to be presented in a clearer manner. More detail was needed when establishing the identity of the material, their properties and the reason why it was chosen to be used in that particular product.

Some evidence was provided about the original form in which the material was supplied and the process that was used for its manufacture, but to obtain higher marks more detail was needed.

Assessment Criteria 6

Learners seemed to have an awareness of the latest developments in the technology of new and smart materials. Learners investigated new and smart materials but more detail was needed on how such materials could be applied in engineering applications.

F559 Instrumentation and control engineering

Section A – Most learners attempted eight questions.

Section B – All learners attempted four or more questions. Centres are reminded to encourage learners to attempt four questions only and spend their time on providing accurate and correct answers rather than wasting time on other questions for which they will get no reward.

In some cases the written response was difficult to decipher and learners should take care to ensure that annotation on drawings is large enough to be read.

Centres are reminded to encourage learners when answering questions that they limit their answers to the space provided on the answer sheet.

Section A – Eight short answer questions

1 This was a popular question attempted by all learners with a number of learners being awarded full marks.

2 Generally well answered with a number of learners being awarded full marks. Those who did not gain full marks had failed either with the naming of the blocks or the positioning of the feedback element.

3 This question caused some problems. It was clear that learners were not fully aware that the signal came from the input and was passed on and converted into a different form.

4 The majority of learners gained both marks for correctly naming two passive transducers.

5 Generally well answered. The principle of the bimetallic strip was known, but the detail of its operation was not.

6 The majority of learners were awarded all three marks for the benefits of simulation software.

7 Generally well answered by the majority of learners correctly giving 'analogue' as the response.

8 This question was not well answered. The formula was incorrectly stated in many cases and those who did give the correct answer showed confusion on the units to be used.

Section B – Four questions from eight to be answered.

1 This was a popular question.

(a) The meaning of the term 'servo control system' was not fully understood by learners who had chosen this question. .

(b) As a result of not showing understanding in part (a) the practical applications given were not always suitable.

(c) Marks were gained for the diagram and labels though in many cases the diagram was for a generic closed loop system. Explanations of the system in some cases failed to refer to the positional control system or to how the error correction was achieved.

2 The majority of learners answered this question, with most gaining marks in all three parts.

(a) The concept of gain was generally understood with a few learners also stating a formula for gain.

(b) A variety of incorrect responses were given and finding more than two valid practical applications was limited, most referred to audio amplifiers or power amplifiers.

(c) (i) The calculation was generally either fully correct or gained no marks.

(c) (ii) As with the previous part those learners who knew the formula and could substitute values into it arrived at the correct answer.

3 The majority of learners answered this question, with most gaining marks in all three parts.

(a) A high proportion of learners named correctly the two labelled components.

(b) A good range of valid practical applications stated.

(c) Few responses scored highly for this part. The action of the LDR was in a number of cases reversed, stating that the resistance increased in line with light value. The action of the potential divider was recognised in some cases but not fully explained and the use of the variable resistor to set a switching value was not referred to at all. Most responses gained a mark for correctly giving the lamp lighting as the output.

4 This was not a popular question.

(a) Very few learners named the different types of cylinder correctly.

(b) Those learners who answered the question generally gave at least two correct applications for the single acting cylinder.

(c) Very few responses scored highly for this part. Those who answered this part showed a three port valve but no use was made of a five port valve to provide an in-stroke for the piston. The written descriptions were generally lacking in detail.

5 This was not a popular question.

(a) The term 'data signal processing' was not fully understood by a number of learners. The fact that the signal is changed was recognised by a few learners.

(b) Most learners who had chosen this question gained at least one mark for stating one advantage of a wave guide as compared to a two conductor type cable.

(c) Most learners did not correctly draw or label a diagram for a wave guide that used transverse magnetic mode of signal propagation. The explanations of the transverse magnetic mode were generally not given at all, or at best were incomplete.

6 A fairly popular question.

(a) At least one main unit of a PLC was known by most learners who had attempted the question.

(b) Reasonable examples of PLC use were given in most cases but there were a few instances of inappropriate applications.

(c) Advantages of PLCs were recognised but these were often not taken a stage further to show how they had impacted on instrumentation and control systems in general. Flexibility of the PLC in being able to be adapted quickly to new production needs was not compared to hard wired logic systems that were dedicated to a single use.

7 The majority of learners answered this question, with most gaining marks in all three parts.

(a) A high proportion of learners stated correctly two features that you would find on a system that is monitoring a factory production line.

(b) The majority of responses gained full marks for this part. The reasons for using video cameras were understood and well explained.

(c) In a number of responses a generic system diagram was used in place of a specific block diagram for a monitoring control system. Learners should be advised to read the question carefully before rushing into a response. Written descriptions were in some cases very brief and did not refer to each part of the system.

8 A fairly popular question.

(a) The meaning of the term 'circuit simulation of electronic circuits' was generally known and most responses gained at least one of the available marks. More reference could have been made to circuit design and testing.

(b) The majority of learners gave three correct benefits of using simulated circuits.

(c) This part of the question required knowledge of how circuit boards can be produced using CAM. The role of the computer in designing and passing on data to the CAM section was appreciated. What was missing was detail of the actual process used and stages that could be controlled by the computer, such as autorouting of tracks and blocking together of circuits to reduce process time.

F560 Maintaining engineering systems

This unit was marked by centres and moderated by OCR.

The following points need to be considered:

- More care needs to be taken when the Unit Recording Sheet is filled in. Centres could provide more teacher comments in the panel provided along with page numbers indicating where evidence can be found.
- Most learners presented work in a neat and tidy fashion but the use of a contents list with page numbers should be encouraged.
- Some limited use was made of photographs. This and other similar types of media are to be encouraged together with much more use of ICT.
- Most of the folders observed followed a standard type of presentation with similar use of some material. In general terms, the centre should be empowering learners to take charge of their own learning and development.

Assessment Criteria 1

Suitable systems listed in the model assignment are process control systems for production lines, timing systems for vehicle engines, electro/mechanical systems for control of items such as hoists, elevators or stock picking systems, hydraulic systems for off-road plant or agricultural equipment and valve control systems for utility industries.

Learners, in general, showed an ability to select, collect and structure production and maintenance data in a limited manner. The application of statistical methods to the data collected did not in all cases determine an appropriate maintenance strategy for the engineered system chosen. All learners satisfactorily undertook some form of basic maintenance activity. More detail could have been provided in identifying the advantages and disadvantages of: preventive measures, predictive measures and repair on demand or run to failure

Assessment Criteria 2

Learners only showed a basic ability to evaluate the correlation between maintenance plans and operational strategy. More detail was needed in identifying and explaining various types of system failure and their consequences. Factors that could have been included are: maladjustment, maloperation, run to failure, stress fracture, fatigue, wear, embrittlement, overloading, seizure, lubrication failure, fouling, vibration, anodic and chemical corrosion. The prediction of system failure could have explained: condition monitoring, visual inspection, shock pulse monitoring, vibration analysis, oil debris analysis, electrical current monitoring, tool wear, infra red thermograph and ultrasonic testing.

Assessment Criteria 3

Learners need to show a better awareness of the correlation between maintenance plans and operational effects. The evaluation of the effects of different approaches to maintenance on operational and strategic efficiency could have included: operator safety, scrap and rework, poor product quality, lost production, improved product reliability, failure to deliver, loss of competitiveness, loss of business, difficulty in planning production, reduction of waste and poor corporate image.

Assessment Criteria 4

Learners were generally unaware of the need to carry out a cost benefit analysis in regards to their maintenance plans. Aspects that should have been considered are: materials and equipment against financial values and reduced costs and increased business, financial value of time and the correct level of spares.

F561 Production and manufacturing

This unit was marked by centres and moderated by OCR.

The following points need to be considered:

- More care needs to be taken when the Unit Recording Sheet is filled in.
- The unit outcome should take the form of a case study based upon an appropriate context.
- The unit content encourages the use of a wide range of teaching approaches to aid learners with a variety of styles to demonstrate their abilities, thus supporting the aim of developing those generic skills that support a young person's employability.
- Care must be taken in the selection of an appropriate manufacturing system based on the centre's locality to enable learners to make a detailed study in an actual learning environment of the: assembly system, assembly techniques involved, quality control checks used, quality procedures and statistical process control employed.
- Learners, need to be provided with every opportunity to carry out individual research, participate confidently and creatively within a team and assess and reflect on their own contribution and that of others.
- Organised visits to local engineering manufacturing companies could be of benefit to the learners in order to understand manufacturing and production methods.
- This unit could be linked with Unit F558 Selection and application of engineering materials and Unit F560 Maintaining engineering systems.

Assessment Criteria 1

Learners need to give more detail in their descriptions of different types of manufacturing processes and systems. Reference should have been made to: one-off and batch, mass production, lean manufacturing, flexible manufacturing and just in time systems.

Assessment Criteria 2

To gain marks in the higher band learners must explain and clearly identify, with reasons and full details, the application of CAE, CAM and CNC within a manufacturing system.

This explanation should include characteristics of scales of manufacture and the influence this will have on selection of manufacturing systems, identifying their advantages and disadvantages. The understanding and advantages of rapid prototyping did not appear to be well known.

Assessment Criteria 3

Most learners were able to give a description of assembly systems but needed to thoroughly research and investigate these systems to gain marks in the higher band.

Evidence of investigation into quality control, quality assurance and statistical process control was lacking in much of the work.

Assessment Criteria 4

Most learners did not produce a detailed production plan. The plan should have included: scale of manufacture, opportunities for the use of CAE, CAM, and CNC, assembly systems and techniques, quality control, quality assurance requirements and statistical process control.

Assessment Criteria 5

Learners needed to give much more detail when producing their computer project plan and a schedule of manufacture for the production of an engineering product. There needed to be clear evidence of how learners had used appropriate software to produce such a plan.

F562 Innovation, design and enterprise

This unit was marked by centres and moderated by OCR.

The following points need to be considered:

- More care needs to be taken when the Unit Recording Sheet is filled in. Centres could provide more teacher comments in the panel provided along with page numbers indicating where evidence can be found.
- Most learners presented work in a neat and tidy fashion but the use of a contents list with page numbers should be encouraged.
- Centres must ensure that learners choose an entrepreneur and not an inventor.

Assessment Criteria 1

A majority of learners scored well in this area. Learners planned and carried out a quite thorough research into a successful engineered product and referenced it to an associated entrepreneur. Sources of research were, in the main, well documented and acknowledged and included as part of their evidence

Assessment Criteria 2

Learners generally showed a good awareness of how early entrepreneurship gives rise to a range of new and innovative products. Many had carried out an analysis of their chosen product and provided good evidence of how it can be developed using new and emerging technologies.

Assessment Criteria 3

Good descriptions were provided relating to the commercial issues of developing and marketing new and innovative products especially in relation to their own chosen items.

Assessment Criteria 4

A reasonable awareness was shown by most learners regarding the environmental and social impacts of engineering activities.

Assessment Criteria 5

Learners presented a reasonable description of sustainable engineering and drew valid conclusions as to whether their chosen engineered product could be construed as being an example of sustainable engineering.

F563 Mathematical techniques and applications

It was a pleasure to see so many well presented and clearly argued solutions to the questions from learners who had clearly developed a very sound understanding of the principles and techniques required for this unit.

Section A – Most learners attempted all fifteen questions.

Section B – Centres are reminded to encourage learners to attempt three questions only and spend their time on providing accurate and correct answers rather than wasting time on other questions for which they will get no reward.

When attempting a question a few learners gave a final answer without showing any working. It is always in the best interest of the learner to show as much detail as possible because if the answer is incorrect nothing can be awarded but if information is provided of how the final answer was arrived at, marks can often be awarded for the methods employed.

Presenters must urge learners to read the questions very carefully noting in particular when an answer is needed to two decimal places or to the nearest degree.

Centres are reminded to encourage learners when answering questions that they limit their answers to the space provided on the answer sheet.

Section A Fifteen short answer questions

1 Generally well answered but in a few cases learners removed the bracket and left the response as 2a3b – 2a4c. To obtain full marks the answer needed to be stated in its simplified form of 6ab – 8ac.

2 Reasonably well answered but a few learners stated (x - 5)(x + 5) instead of the correct answer (x - 5)(x - 5).

3 A badly answered question. A number of learners did not understand that the denominator was the same for 'a' and 'd'.

4 Generally well answered. In a few cases after finding 4x - 10x = 12 - 8 learners could not correctly arrive at x = -0.67 correct to 2dp.

5 A mixed response. A high proportion of learners stated the incorrect formula for the length of the minor arc and could not transpose correctly for the angle subtended by a circle.

6 Generally well answered. In a few cases the answer was not corrected to the nearest degree.

7 Not a very popular question. Almost all learners did not understand that a 45 degree right-angle triangle was involved.

8 Generally well answered using a variety of correct formulae.

9 Generally well answered. In a few cases the rules of differentiation were not known.

10 A mixed response. Most learners differentiated 3x^2 correctly but had no idea of how to differentiate ln(4x).

11 Generally well answered.

12 Learners found this question difficult.

13 Not a popular question. Most learners did not demonstrate understanding of the meaning of the term 'relative frequency'.

14 Generally well answered. A high proportion of learners answered this question correctly.

15 Generally well answered. A high proportion of learners answered this question correctly.

Section B The learner had a choice of answering three questions from eight.

1 Not a very popular question.

(a) Very few learners could show that $u = \sqrt{(v2 – 2gh)}$.

(b) Generally well answered by learners substituting given values into their equation from part (a).

(c) Very few learners could show that R2 = RR1/(R1 – R).

2 A very popular question.

(a) Generally well answered with a majority of learners giving the correct response that Q = 30N and P = 6N.

(b) Generally well answered with a majority of learners giving the correct response for both forces.

(c) Generally well answered.

3 Not a very popular question. Presenters and learners are urged to re-read the specification that deals with trigonometry and in particular the exemplification column that provides an example of this type of question.

4 A fairly popular question.

(a) Generally well answered with a majority of learners giving the correct response that r = 144.5 m correct to 1dp. In a few cases the answer was not corrected to one decimal place.

(b) (i) Generally well answered.

(b) (ii) & (iii) A high proportion of learners could not state or use the cosine rule correctly. In a number cases the answer was not corrected to one decimal place.

5 A very popular question.

(a) Generally well answered with well drawn accurate graphs.

(b) Generally well answered with a correct response of between 2.5 and 2.7 seconds

(c) Not a very popular question. Many learners did not use the correct limits as 2.6 and 6 seconds.

(d) Many learners did not understand that the distance travelled in 6 seconds was the answer to part (c) plus 9.6.

6 Not a very popular question.

(a) This part was poorly answered. Many learners did not understand that the angular velocity was found by differentiating the angular displacement equation.

(b) Because the angular velocity was not quoted as 4 cos4t this led to incorrect answers when the time was to be found for an angular velocity of 3 radians per second.

(c) This part was poorly answered. Many learners did not understand that the angular acceleration was the second differentiation of the angular velocity

(d) Because the angular acceleration was not quoted as -16sin 4t this led to incorrect answers when the time was to be found for an angular acceleration of 8 radians per second per second.

7 A reasonably popular question.

(a) Most learners did not correctly state the addition law for probability or state the multiplication law for probability.

(b) Very few learners gave a correct answer to the probability that there are two round-head screws and either a flat-head screw or a countersunk screw when three screws are drawn at random, without replacement.

8 A very popular question.

(a) Many learners stated the correct answer as machine one but gave very limited response as to why this was so.

(b) **(i)** Most learners completed the table correctly.

(b) **(ii)** Most learners completed the graph correctly

(b) **(iii) & (iv) & (v)** Most learners gave a correct answer for the median age of the machine, lower and upper quartiles and the inter-quartile range.1

F564 Scientific principles and applications

It was a pleasure to see so many well presented solutions to the tasks/experiments from learners who had clearly developed a very sound understanding of the principles and techniques required for this unit.

This unit was marked by centres and moderated by OCR.

Centres submitted the Attendance Register and the Centre Authentication Form correctly filled in and on time.

The following points need to be considered:

- Learners presented work in a neat and tidy fashion but the use of a contents list with page numbers is to be encouraged.
- The annotation found on individual learners work was found to be useful but the column headed 'Page' needs to be completed.
- When a disc is being submitted, it must be labelled with Centre number_Candidate number_Unit number_Series.
- Some use was made of photographs. This and other similar types of media are to be encouraged.

Centres are reminded that the OCR Web page is always being updated and should be regularly looked at. For the next submission the latest model assignment is available with some details as follows:

For assessment you will undertake ten tasks which will cover the Learning Outcomes.

Task	Learning Outcomes
1	1 Forces and Motion and 2 Kinematics
2	3 Dynamics and 4 Force, Work and Power
3	5 Deformation of solids and 17 Properties of Materials
4	6 Electricity
5	10 Gravitational Fields, 11 Electric Fields and 12 Capacitors
6	13 Electromagnetism and 14 Electromagnetic Induction
7	15 Thermal physics and 16 Nuclear Atom and Radioactivity
8	18 Electronics
9	7 Quantum Physics, 8 Electromagnetic Waves and 9 Waves
10	19 Chemical Reactions and 20 Organic Compounds and functional groups

Each task will be marked out of 30 marks giving a total of 300 marks for this unit.

Learners submitted a folder of ten tasks/experiments to satisfy the assessment requirements for this unit. Each experiment consisted of eleven points. The learning outcome 'Health and Safety' did not appear as a separate point but was inherent throughout the conduct of all of the experiments.

Title, description and theory

Learners stated a title, gave a thorough explanation of the theory behind the experiment with fairly detailed knowledge being presented and adequately described the stages involved in the experiments. In some cases there were omissions and inaccuracies.

Equipment, diagrams and photographs

Learners listed the equipment used with a reasonable degree of accuracy but a few learners needed to make clear that they could find and use the same equipment again if the experiment needed to be repeated. Most learners produced clearly drawn diagrams, fully and accurately labelled. The use of annotated photographs was found to be very useful in the moderation process.

Methodology

Learners described in reasonable detail the method of carrying out the experiments and gave details of any health and safety issues that needed to be considered. In some cases more detail was needed about how the experiment had been carried out and much more emphasis needed to be placed on health and safety matters.

Results, format and errors

Learners generally produced results in the form of a table. Tabulated data, as seen, is much easier to interpret and use than a disconnected collection of numbers. The labelling of the table, in some cases was not completely accurate. Most learners stated the correct quantity but did not correctly state the unit. For example, m/s was used instead of ms^-1.

Where appropriate graphs were drawn to a sensible size with accurate labelling of axes. It was obvious from the graph where data had been taken from to work out subsequent values. A number of learners could have made a more detailed statement of how accurately the results had been taken and how many errors had been found and how these errors had been dealt with. It is often a useful practice to leave the equipment intact so that if errors or omissions become obvious it is possible to check previous observations since the equipment is still available for use.

Conclusion

In some cases learners needed to give a more detailed explanation of their conclusions giving in particular a more in-depth evaluation of all aspects of the experiment.

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