OCR
RECOGNISING ACHIEVEMENT

Principal Learning

Engineering

OCR Level 3 Principal Learning **H811**

OCR Report to Centres

June 2012

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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.

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

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Principal Learning

OCR Level 3 Principal Learning in Engineering (H811)

OCR REPORT TO CENTRES

Overview

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

With moderated Units Centres are reminded that it is essential that the Controlled Assessment Summary Form is accurately completed.

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.

In some cases 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.

To gain higher marks a more detailed analysis of the risks associated with the business was needed.

Assessment Criteria 2

The majority of learners presented an adequate 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 understood but more detail would have been useful.

Assessment Criteria 3

An adequate description and evaluation was given by learners dealing with environmental issues linked to engineering businesses.

To gain higher marks a more detailed explanation and a deeper evaluation was needed in all areas of these criteria.

Assessment Criteria 4

Learners provided an adequate explanation of the possible effects of external environmental factors and how they are managed within a typical business organisation.

To gain higher marks a more detailed explanation was needed in all areas of these criteria.

Assessment Criteria 5

All learners undertook a simple chemical analysis using local environmental samples presenting their findings in a clear and logical format. Good use was made of graphs and photographic evidence by a high proportion of learners. To gain higher marks a more detailed analysis and evaluation of results was needed.

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.

Learners should present a contents list with page numbers and then make sure that the numbers appear on the URS888 and the work.

It is recommended that learners 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.

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, learners should produce a design brief and specification.

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. 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. Little evidence was provided for simulation motion in parts and assemblies and how the use animation was carried out to explain the workings of mechanisms. 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

Much 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 could make more comments on the Unit Recording Sheet in the teacher comments panel provided. The column headed 'Page' also needs to be completed.

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 much more use of ICT.

It is recommended to divide 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. Centre should be empowering learners to take charge of their own learning and development.

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 an adequate 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 much 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

This unit was marked externally.

Section A – Most learners attempted ten 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.

Centres should encourage learners to limit answers to the space provided on the answer sheet.

Section A – Ten short answer questions

1 This was a popular question attempted by all learners with a number of learners being awarded full marks for being familiar with input and output devices.

2 Generally well answered with a number of learners being awarded full marks. All learners knew that feedback was the difference between open and closed loops systems; the majority had picked the right one to have feedback.

3 The formula for gain in a positive feedback system was relatively well known. There were some errors in the detail but in general learners gained the mark for this one.

4 The concept of multiplexing was not widely known in detail. There were a few learners who failed to respond to this part of the question. In general learners knew that it involved putting more than one signal down the same route but after that the detail was hazy.

5 The majority of learners gained at least one mark for knowing that an instrument display gives a representation of data, there were not many who described it as an output unit or device.

6 The majority of learners gained at least one mark for stating a practical application of the Proportional-Integral-Derivative controller (PID).

7 Generally well answered by the majority of learners correctly giving at least one benefit of virtual test equipment.

8 The responses to this question on wave guides showed slightly more knowledge than has been seen in the past on similar questions. A number of learners gained the first mark for a general description of the wave guide; fewer knew how it worked.

9 A device for measuring flow in a control system was generally well known with the majority of learners gaining the one mark available.

10 From the four devices given the best known was the bimetallic strip which gained a mark for the majority of learners. The principle of the thermocouple was not very well known. The thermistor was the second device to be correctly identified by a number of learners. The last statement that described a capacitor did not result in many correct responses.

Section B Four questions from eight to be answered.

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

(a) Most responses had good examples of LED use; learners should be advised that for this type of question there are no extra marks for choosing an obscure example, they are better off playing safe with a readily available example.

(b) Some advantages of LEDs were very well known; however, the most obvious such as shape and colour were rarely mentioned. Learners should avoid making assumptions about the relative cost of components where there is no evidence to support their argument.

(c) The seven segment display was well known and most responses included an accurate drawing of the device; labelling of the segments was frequently not in the correct order though. In addition to the general description of the device some knowledge of the connections was needed with reference to common connections, this factor was often omitted. The fact that segments could be combined to give numbers and letters was well known.

2 This was not a very popular question.

(a) In this question there was often confusion between pneumatics and hydraulics with reference to fluid flowing through the system. Learners must be advised that a question on pneumatics will be concerned with systems powered by compressed air; examples of uses of pneumatics did include a number of devices that could not be accepted for this reason.

(b) The correct names for the pneumatic components were not well known. A few learners gained a mark for the single acting cylinder but very few correctly identified the shuttle valve.

(c) The majority of learners appreciated that the valves had to be pressed to operate the single acting cylinder but the understanding of the operation of the shuttle valve was virtually non-existent. A number of learners stated that they expected the second valve to in-stroke the piston rather than the spring return.

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

(a) The question asked for the input and output element of the system to be identified. Although the expected response was the preamplifier and power amplifier many responses had used the microphone and loudspeaker, these were also credited with a mark.

(b) Having used the microphone and loudspeaker for part (a) a number of learners went on to choose the pre-amplifier and power amplifier as transducers, this response gained no marks.

(c) Descriptions of how sound are applied to the system and output from the system was accurate and in most cases gained marks. The tone control for adjusting the balance of high and low frequencies and the volume control to adjust the strength of the signal was not well known.

4 This was not a popular question.

(a) The majority of learners did not understand what was meant by the term 'monitoring system'. Very few learners made any reference to collection and storage of data for later analysis; reference was made instead to closed loop systems in general and the feedback element in them.

(b) In general the examples chosen for this part were close enough to gain the marks; choice would have been easier if understanding of the data collection and storage aspect had been appreciated.

(c) The majority of learners did not provide a diagram to illustrate a monitoring system of their choice. Written descriptions were in some cases very brief and failed to refer to each part of a monitoring system.

5 This was not a popular question.

(a) The term 'control theory' was not fully understood by most learners.

(b) Most learners presented a labelled diagram of the positional control system generally showing the main elements of the system in the correct position.

(c) In general the formula for a negative feedback amplifier was correctly stated and used to determine the overall gain. Other evidence showed that some learners had no idea of how to calculate the overall gain.

(d) The formula was generally known but a high proportion of learners could not transpose the equation to determine the feedback fraction. Subsequently few correct answers were seen.

6 A fairly popular question.

(a) The term 'Programmable Logic Controller (PLC) was generally well known though a few learners did not appreciate the digital nature of the inputs.

(b) Most learners gave correct examples of practical applications of a PLC. The answers provided were wide ranging. There were a few instances of inappropriate applications.

(c) The requirement was for a detailed description of three features of the PLC; the programmable nature of the unit/storage of instructions were generally mentioned. Detail on suitable inputs and output devices and storage of past data did not feature in many answers.

7 This was not a popular question.

(a) The term 'signal processor' was not well known but those learners who did attempt it generally gained marks.

(b) Knowledge of signal transmission problems when using wires was not evident in many cases. Resistance increase was mentioned along with the wire acting like an aerial but other possible problems were not given.

(c) The description of the transverse magnetic mode of wave guide propagation was generally not given at all, or at best was incomplete.

8 A very popular question.

(a) Simulation of circuits was well known to the majority of learners. Appreciation of the benefits provided by a simulated circuit was widespread. In some cases there was some confusion about whether a comparison between analogue and digital circuits was being asked for.

(b) The analogue signal was generally well drawn, gaining a mark. The digital signal in some cases was drawn as a sine wave with a series of horizontal and vertical lines. With a digital signal there will not normally be a variation in the amplitude of the signal, only in the frequency.

(c) The two voltmeters were generally placed and connected correctly. The ammeter was in a number of answers connected in parallel, this did not gain any marks. Learners need to be reminded that an ammeter is always connected in series with a component.

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. Incorrect candidate numbers are being quoted and in some cases the candidate number is missing altogether. 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.

Good 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 was needed when dealing with justified conclusions.

Assessment Criteria 2

Some learners showed only a basic ability to identify and explain the various types of system failure and their consequences. The methods used to predict systems failure was not well known. More detail needed to be provided when dealing with justifications.

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.

In a number of cases learners provided a very basic 'cost benefit' analysis in regards to their maintenance plans. The justification of financial factors was covered at a low level.

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.

Most learners presented work in a neat and tidy fashion but the use of a contents list with page numbers should be encouraged. A number of learners had not provided page numbers on their work.

Some use was made of photographs; this and other similar types of media are to be encouraged.

Most of the folders observed followed a standard type of presentation with similar material being used. In general terms the centres should be empowering learners to take charge of their own learning and development.

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

A number of learners were able to give a detailed description of different types of manufacturing processes and systems.

It should be clear that a manufacturing system includes one off batch mass production and a manufacturing process can be casting, forming, cutting and joining. A number of learners provided very little information about processes.

Where a learner was clear about systems and processes the advantages and disadvantage were clearly explained.

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.

Assessment Criteria 3

Most learners gave details of investigating and researching into assembly systems and techniques, quality control and quality assurance requirements and statistical process control. All research was very theoretical missing the opportunity to make the findings more exciting. The use of images would have helped.

Assessment Criteria 4

Most learners did not produce a detailed production plan. The details that need to be taken into account include:
materials, parts and components to be used including assembly systems
processes to be used and statistical process control
tools, equipment and machinery to be used
the sequence of production, including critical production and quality control points
production scheduling, including realistic deadlines
how quality will be checked and inspected
health and safety factors.

Emphasis needs to be placed on industrial visits, the use of videos and having visiting speakers.

Assessment Criteria 5

More detail was needed about software and how it was used to prepare a schedule for manufacture. A schedule for the production of an engineering product should include:
all preparation, processing and assembly stages
the sequencing and timing of stages
critical production and quality control points
production and quality control procedures
allocation of tasks and responsibilities.
Most learners presented a Gantt chart.

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, the use of a contents list with page numbers should be encouraged.

It is recommended that all learners 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.

In a number of cases learners needed to state at the beginning of the work which product and entrepreneur was being considered.

Some use was made of photographs; this and other similar types of media are to be encouraged.

Most of the folders observed followed a standard type of presentation with similar material being used. In general terms the centres should be empowering learners to take charge of their own learning and development.

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.

Higher marks could have been obtained by giving a deeper analysis of the product as an example of an innovative engineering design.

Assessment Criteria 3

Learners needed to give more detail concerning the issues of marketing and selling the new product. Other learners did not give sufficient detail when critically evaluating the commercial aspects of the product.

The principles of developing, marketing and selling a new product should have included: market research, protecting ideas, business planning, start-up costs, finance and grants, taxes, health and safety, IT and e-commerce, sales and marketing.

Assessment Criteria 4

A reasonable awareness was shown by some learners regarding the environmental and social impacts of engineering activities. Other learners needed to be more aware of the local and global impact of engineering in terms of: resources, noise, ecology, biodiversity and climate. In some cases the learner needed to produce a detailed evaluation of the environment and social impact of the product studied. A number of learners needed to give more detail of the social impact of engineering, locally and globally in terms of: economic well being, physical safety, health and security.

Assessment Criteria 5

Some 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. More detail could have been provided describing sustainability in terms of energy, materials, chemicals and water. The use of materials that are renewable within the lifetime of the product they are part of and that are capable of return to ecological systems to perform useful function was not fully covered by many learners.

F563 Mathematical techniques and applications

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.

This unit was marked externally.

Section A – Most learners attempted all fifteen questions.

Section B – All learners attempted three or more questions. 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 did not correctly state + 5cd.

2 Generally well answered.

3 A badly answered question. A number of learners could not transpose the equation for M.

4 Generally well answered. In a few cases after finding $3x + 6 = 6x + 12$ learners could not correctly arrive at $x = -2$.

5 A badly answered question. Presenters are advised to look at learning outcome 1 and assessment criteria 1.16 together with the exemplification column.

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

7 Generally well answered.

8 A mixed response. A proportion of learners stated the incorrect formula for the area of a triangle given the length of two sides and an angle.

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

10 A mixed response. Most learners differentiated e^{-4x} but a multitude of incorrect answers were also given.

11 A mixed response. A number of learners omitted the constant C.

12/13/14/15 generally well answered.

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

1 (a) Generally well answered with a majority of learners giving the correct response of 3141.59 m^2 correct to 2 dp.

(b) (i)(ii) Generally well answered with a majority of learners gaining full marks.

(c) Generally well answered.

2 Presenters and learners are urged to re-read the specification that deals with simultaneous equations.

3 (a) (i)(ii) Generally well answered with a majority of learners giving the correct response that Angle B = 68^o and the length of side c = 108.25 m correct to 2 dp.

(b) (i) Generally well answered with well drawn accurate diagrams.

(ii) A high proportion of learners could not state or use the cosine rule correctly. In number cases the answer was not corrected to two decimal places.

4 (a) Generally well answered.

(b) This part was poorly answered. Many learners did not know that sec A = 1/ cos A and cosec A = 1/ sin A.

(c) The formula for calculating a minor arc was not well known.

5 (a) Many learners did not know the formula for the total surface area of a cylinder.

(b) Learners did not calculate the radius of the cylinder thus causing problems with the remainder of the question.

6 (a) A number of learners did not gain marks because they had difficulty with the integration.

(b) (i)(ii) Generally well answered.

(iii) A number of learners did not gain marks because they had difficulty with the integration.

7 (a) Generally well answered with a well drawn accurate graph.

(b) The majority of learners completed all parts correctly and gained high marks.

8 (a) Most learners completed the table correctly.

(b) The majority of learners completed all parts correctly and gained high marks.

F564 Scientific principles and applications

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.

Markers must provide annotation. Work that contained a lot of ticks but little or no annotation does not help the moderation process.

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 in some cases it was easy for pages to slip out and get misplaced or lost. The use of a treasury tag is strongly recommended.

Some use was made of photographs. This and other similar types of media are to be encouraged.

When a disc is being submitted, it must be labelled with Centre number_Candidate number_Unit number_Series.

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. Other learners made use of identification codes. 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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