![OCR Oxford Cambridge and RSA]

Live Assessment

Assessment Material

OCR Level 1/2 Cambridge National Award in Systems Control in Engineering
OCR Level 1/2 Cambridge National Certificate in Systems Control in Engineering

Unit R115: Engineering applications of computers

Please note:

This OCR model assignment is to be used to provide evidence for the unit identified above. Alternatively, centres may 'tailor' or modify the assignment within permitted parameters (see Information for Teachers). It is the centre's responsibility to ensure that any modifications made to this assignment allow learners to show that they can meet all of the learning outcomes and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.

INSTRUCTIONS TO TEACHERS

The OCR administrative codes associated with this unit are:

- unit entry code   R115

- certification codes   Award J833 / Certificate J843

The accreditation numbers associated with this unit are:

- unit reference number   [J/505/3544]

- qualification reference(s)   Award [601/1406/X] / Certificate [601/1407/1]

- **Duration: Approximately 10-12 hours**

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Live Assessment: Information for Learners

OCR Level 1/2 Cambridge National Award in Systems Control in Engineering
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Unit R115: Engineering applications of computers

Scenario for the Assignment

Computers and microprocessors play a key role in the design, development and manufacture of engineered products.

An engineering manufacturer is to expand their production facility and is planning to automate production and maintenance where possible.

In order to ensure that the investment in automation technology is spent wisely, the managing director wishes to gain a detailed understanding of automation within engineering.

Read through all of the tasks carefully, so that you know what you will need to do to complete this assignment.

Your Tasks

Task 1: Computers in engineering design, manufacture and process control

Learning Outcome 1, Understand how computers are used in engineering design, manufacture and process control, is assessed in this task.

Engineered products are often designed and manufactured using computerised systems.

You are to investigate how computers are used within engineering design, manufacture and process control.

You should demonstrate your ability to draw upon relevant skills/knowledge/understanding from other units you have studied in this task.

Task 2: Computers and maintenance

Learning Outcome 2, Understand how computers are used for maintenance for engineering systems, is assessed in this task.

Human Machine Interface (HMI) and expert systems are used within engineering to communicate system operation, diagnostic and maintenance information. They can inform the user/operator that they are working correctly; diagnose any faults and assist with maintenance.

Your task is to:
- investigate how HMI and expert systems are used to:
    – communicate operation of a system or machine to the user or operator;
    – diagnose any problems with its correct operation;
    – assist the operator or maintenance personnel with maintenance of the system or machine.

- identify and access a system that uses a HMI or expert system:
    – interrogate the system (e.g. look at operation and fault data)
    – interpret the data (e.g. explain what the data means)
    – recommend any corrections or modifications to the system based on this data.

Task 3: Computers and communication of production and maintenance data

Learning Outcome 3, Know how computers are used to communicate and use data for production and maintenance, is assessed in this task.

Computers used in the production of engineered products gather and communicate data with operators and users, and between themselves. This data can be used to analyse the efficiency of the production process, and can also be used to assist with maintenance.

You will investigate and explain:

- how data gathered during production operations is used in order to ensure that production is as efficient as it can be
- how data collected during production operations is used to assist with maintaining the reliability, accuracy and efficiency of the system or machine
- how computers are used to gather, communicate and exchange data required to help maintenance personnel perform the required maintenance operations
- how hand-held computers are used both within the manufacturing process and for maintenance.

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Information for Teachers

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Unit R115: Engineering applications of computers

Guidance on using this assignment

1   General guidance

1.1   OCR assignments are available to download free of charge from our website:
www.ocr.org.uk

1.2   OCR assignments are intended to be used for summative assessment of learners. The OCR specification gives more information on the arrangements for assessing internally assessed units.

1.3   This assignment has been designed to meet the full assessment requirements of the unit. Learners will need to take part in a planned learning programme that covers the underpinning knowledge, understanding and skills of the unit.

2   Before carrying out the assignment

2.1   Learners should be provided with a copy of the *Information for Learners* section of this assignment.

2.2   Learners will not need to carry out any preparations prior to undertaking the assessment tasks, such as collating resources to use in the assessment

2.3   We have estimated that it will take approximately 10-12 hours to complete all tasks. Learners would need approximately 2-3 hours to complete Task 1 and approximately 6-7 hours to complete Task 2 and 2 hours to complete Task 3. These timings are for guidance only but should be used by the teacher to give learners an indication of how long to spend on each task. Centres can decide how the time can be allocated between each part or individual task. Centres are also permitted to spread the tasks across several sessions and therefore it is permissible for evidence to be produced over several sessions.

3   When completing the assignment and producing evidence

3.1   Each learner must produce individual and authentic evidence for each task within the assignment.

3.2   Centre staff may give support and guidance to learners. This support and guidance should focus on checking that learners understand what is expected of them and giving general feedback that enables the learner to take the initiative in making improvements, rather than detailing what amendments should be made. It is not acceptable for teachers/deliverers to provide answers, to work through answers in detail or to detail specifically what amendments should be made.

3.3   Learners may use information from any relevant source to help them with producing evidence for the tasks.

3.4   Learners must be guided on the use of information from other sources to ensure that confidentiality is maintained at all times.

3.5   Usually, the type of evidence required may be modified, with the exception of certain types of evidence listed below under '*Permitted changes*'. It is important to note that it is possible to generate the evidence in a variety of formats. Centres must advise learners as to the most appropriate format of evidence. The nature of this assessment means that learners are free to use the format that they feel is most appropriate for the purpose and target audience for each individual task (see Section 6).

4   Presentation of work for marking and moderation

4.1   Centres wishing to produce digital evidence in the form of an e-portfolio should refer to the appendix in the specification on guidance for the production of electronic assessment.

4.2   Centres may wish to discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, e.g. spiral bound, stapled booklet, treasury tag.

4.3   All work must be marked against the marking criteria for the unit. Marks are allocated to learning outcomes rather than tasks. Please see Appendix B Marking criteria for centre assessment and Section 4 The centre assessed units in the specification for this qualification for more information on marking, moderation and submission of work.

5   Scope of permitted model assignment modification

The model assignment is self-contained in its present form. The set of tasks form a coherent whole addressing all the learning outcomes and allowing access to the full range of marks.

You must not change the following:

- the learning outcomes

- the marking criteria

- the requirements for supervision and authentication as described in the specification (Section 4 *The centre assessed units*)

- the maximum duration for completion of the assignment.

Permitted changes:

The model assignment can be modified in terms of the areas described below but centres must be sure that learners still have the opportunity to cover all of the learning outcomes and to access the full range of marks:

- the scenario, which can be contextualised or amended to suit local needs
- each specific task may be appropriately contextualised to match with any permitted changes you have made to the scenario.

A thematic approach linking Learning Outcome 1 (LO1) through LO2 to LO3 is desirable for the assignment, although it must be noted that access to a Human Machine Interface (HMI) or expert system is required in LO2. This might not be the same equipment that is used in the manufacture of the chosen scenario or case study, which is acceptable.

OCR has ensured that in the language used and the tasks and scenario provided we have avoided discrimination, bias and stereotyping and support equality and diversity. In the development of qualifications and assessments we use the guidance given in the Ofqual publication *Fair access by design,* notably this includes:

- using language and layout in assessment materials that does not present barriers to learners
- using stimulus and source materials in assessment materials (where appropriate) that do not present barriers to learners.

If centres wish to modify the model assignment we strongly advise that staff responsible for modifying the model assignment and the quality assurance of it refer to the publication *Fair access by design*.

If modifications are made to the model assignment, whether to just the scenario or to both the scenario and individual tasks, it is up to the centre to ensure that all learning outcomes can still be met and that learners can access the full range of marks.

6   Specific guidance on the task

Task 1
A product case study (e.g. vacuum cleaner) could be used as the vehicle for assessment of this task. Learners are required to investigate how computers are used from design to manufacture, identifying how they are used in the design process, manufacture, dispatch and delivery of the product. For aspects of this task, learners should be encouraged to draw on knowledge, skills and understanding from other units in the specification.

Learners could use knowledge gained in unit R113 to understand the process of automatic system testing.

Task 2
Learners are required to investigate and explain how both Human Machine Interface (HMI) and expert systems work in order to communicate system operational information, and how they are used in diagnostics and maintenance. This task could be linked to LO1.

They are also required to have access to a HMI **or** expert system in order to interrogate it to obtain data. The data needs to be analyzed in order to make recommendations for modifications or corrections to the system. Only one type of system needs to be accessed and appropriate risk assessment and safe working procedures must be followed whilst accessing the system. Evidence of HMI/expert system interrogation and analysis must be supported by a signed witness statement and may be in the form of text, photographs or video and screenshots.

Task 3
A product case study (e.g. vacuum cleaner) could be used as the vehicle for assessment of this task and it could be linked to LO2 and LO3.

Learners are required to investigate and explain how computers used in manufacture communicate and utilise data for production and maintenance. There are three fundamental aspects to consider: - production data gathered during the production process and analysed; data gathered during the production process which is used for maintenance; data used for maintenance operations. It is recommended that the examples given in the specification for LO3 be considered carefully as guidance.

Learners are also required investigate and explain how hand-held computer devices are used in both manufacturing and maintenance operations.

Total marks for assignment: 60

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Witness Statement – Task 2

LEARNER NAME	
Date	
Unit	Unit R115 – Engineering applications of computers
LO2	Be able to interrogate an HMI or expert system and act upon information obtained.

Independent working to manufacture, appropriate safety precautions and testing	
Witness observations	

Name of witness: _____

Relationship to learner: _____

Assessor comments: How the observations demonstrate achievement against the marking criteria

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RECORD OF QUESTIONS/ANSWERS (if applicable)

ASSESSOR QUESTION 1

LEARNER RESPONSE 1

ASSESSOR QUESTION 2

LEARNER RESPONSE 2

ASSESSOR QUESTION 3

LEARNER RESPONSE 3

ASSESSOR SIGNATURE:		DATE:	

LEARNER SIGNATURE:		DATE:	