

EDEXCEL NATIONALS
UNIT 25 PROGRAMMABLE LOGIC CONTROLLERS

ASSIGNMENT No.4

NETWORKS AND ARCHITECTURE

NAME:

I agree to the assessment as contained in this assignment. I confirm that the work submitted is my own work.

Signature

Date submitted

On completion of this unit a learner should:

- 1 Understand the selection, hardware and software requirements of a programmable controller
- 2 Be able to use programming techniques to produce a program for a modern programmable controller
- 3 Understand complex programmable controller applications
- 4 Understand data communications media and networks used with modern programmable controllers.

FEEDBACK COMMENTS

This assignment assesses P1, P6, P7 and M3.

Grade Awarded:

Assessor Signature _____

Date: _____

Internal verifier Signature _____

Date: _____

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Grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that the learner is able to:	To achieve a distinction grade the evidence must show that the learner is able to:
<p>P1 describe the selection criteria and a practical application for a unitary, a modular and a rack-mounted programmable controller</p> <p>P2 explain the system hardware and software requirements for a programmable controller application</p> <p>P3 use a programming method to produce, store and present a program that demonstrates the full range of instruction types</p> <p>P4 explain the program documentation that has been used for a complex engineering application</p> <p>P5 describe the importance of health and safety when working with programmable controlled equipment</p>	<p>M1 select and describe the benefits and limitations of a programmable controller for a specific application</p> <p>M2 justify the choice of a specific programming method and the methods used to produce, store and present the program</p> <p>M3 compare two different networks used for a modern programmable controller system.</p>	<p>D1 evaluate program documentation used to control an automated machine/process and make recommendations for improvement</p> <p>D2 compare the current capabilities and limitations of a programmable controller and identify possible areas of future development.</p>

Grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that the learner is able to:	To achieve a distinction grade the evidence must show that the learner is able to:
<p>P6 explain how one example of each of the three types of communication media would be selected for a specific programmable controller application</p> <p>P7 describe a network and relevant standards and protocols used for a modern programmable controller system.</p>		

DETAILS

In this assignment you must produce a written report explaining all the items detailed below. You should read your notes, study textbooks and draw on any other source of information such as manufacturers catalogues.

1. Three styles of PLC's are known as **UNITARY**, **MODULAR** and **RACK-MOUNTED**. Explain what this means and what the relative advantages and disadvantages of each are. Include some pictures and diagrams to show what you mean. Try and find some examples at your work place.
2. What are typical switching voltages that may be applied to the inputs of a PLC? Describe at least FIVE types of sensors that could be connected to a PLC to enable it to control a typical industrial process (not analogue).
3. What are typical switching voltages that may be obtained from a PLC? Describe at least FIVE devices that may be controlled in an industrial process. Pictures and diagrams will be useful. Explain the purpose and principles of opto-isolators in PLC's.
4. Explain how a PLC stores a programme and executes it. You should explain the following.
 - i. CPU
 - ii. ALU
 - iii. ROM
 - iv. RAM
 - v. Registers
 - vi. Busses
 - vii. Flags

Produce a diagram showing how the various parts of a PLC are connected both electrically and mechanically.

5. The following is a list of terms to do with how digital information is communicated between parts of a PLC and with external items such as programming panels and computers. Write a brief description of each and outline the advantages and disadvantages of each.
 - i. Twisted pair.
 - ii. Coaxial cable.
 - iii. Fibre optics
 - iv. Networks

You must complete this assignment within 4 weeks following the date it is issued.

6. Define the following and give an example of where each may be used.
 - i. LAN
 - ii. Ethernet
 - iii. Intranet