



Question Paper

Module 6:	Power and Automation	
Date: 11 May 2016	Time: 09:30 – 12:00	Duration: 2½ hours

You should have the following for this examination: **one answer book; pencil, pen and ruler.**

All questions carry equal marks. The maximum marks for each section within a question are shown. Answer **ALL SEVEN** questions, starting each new question (1-7) on a **new** page of the answer book.

1.
 - a) State **THREE** methods that should be considered in order to make safe an electric circuit before working on the circuit or associated machinery. (3 marks)
 - b) Describe briefly how a generator works to produce alternating current (AC) electricity. (3 marks)
 - c) State the **TWO** basic uses for water in flour mills, giving **ONE** practical example of **EACH**. (2 marks)
 - d) Describe briefly why energy efficiency is important in flour milling. (4 marks)

2.
 - a) With the aid of a labelled diagram, describe how a pulse jet filter works. (5 marks)
 - b) Define what is meant by the term 'air to cloth ratio'. (1 mark)
 - c) Describe **THREE** factors that influence the air to cloth ratio. (3 marks)
 - d) Describe why a UK flour mill must have effective dust collectors installed. (3 marks)

3.
 - a) Describe a three-phase squirrel cage motor, stating what the **THREE** main components are and their purpose. (4 marks)
 - b) Describe a Variable Frequency Drives, stating its **TWO** main advantages over a fixed speed drive. (4 marks)
 - c)
 - i) Sketch and label the main parts of a roller chain. (2 marks)
 - ii) Explain why it is important that a roller chain is correctly tensioned. (2 marks)

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4. a) Describe the significance of terminal velocity in pneumatic conveying systems. (2 marks)
- b) Describe BOTH a positive pressure conveying system AND a negative pressure conveying system, fully explaining the differences between them. (8 marks)
- c) Describe how to balance a negative pressure conveying system manually. (2 marks)
5. a) i) Explain why weight measurement is important in flour milling. (2 marks)
- ii) Describe FOUR examples of where it is essential to measure weight. (4 marks)
- iii) Describe THREE methods used to measure weight. (3 marks)
- b) Explain why it is important to monitor bin stocks. (3 marks)
6. a) With the aid of sketches, describe how plant is controlled by:
- i) Traditional relay-based controls; (3 marks)
- ii) Programmable Logic Control (PLC). (3 marks)
- b) State the main differences between PLC and relay control systems. (3 marks)
- c) State SIX advantages of using PLC in the mill. (3 marks)
7. Describe how process control systems are used in the following areas:
- a) Wheat moisture control and tempering; (3 marks)
- b) The roller floor; (3 marks)
- c) Maintenance; (3 marks)
- d) Administration. (3 marks)