THE OPEN UNIVERSITY OF SRI LANKA

FACULTY OF ENGINEERING TECHNOLOGY

BACHELOR OF INDUSTRIAL STUDIES – LEVEL 06

FINAL EXAMINATION – 2011

MEX6351 – INDUSTRIAL AUTOMATION

DATE : ***22 MARCH 2012***
TIME : ***1400HRS -1700HRS***
DURATION : ***THREE HOURS***

PLEASE READ THE FOLLOWING INSTRUCTIONS BEFORE ANSWERING THE PAPER

INSTRUCTIONS:

1. *This paper consists of eight questions. Answer any **five questions only.***
2. *All question carry equal marks.*
3. *Answers should be written on the answer books provided by the Examinations Division.*
4. *Commence to answer each question on a **fresh page***

Question 01

(1.1) Distinguish a technical system a technical process in relation to an industry. Elaborate on your answer by taking suitable examples from the manufacturing industry.

(1.2) Discuss the applicability of automation in manufacturing industries. Site examples where automation is undesirable in an industry.

(1.3) What are the types of automation other than industrial automation that you a aware of? Describe four such types of automation.

Question 02

(2.1) Explain briefly the structure of an automated industrial plant. Site examples to describe each of the elements within the structure.

(2.2) Automating certain industrial processes may not necessarily realize the potential benefits of automation. Why? You may take a suitable example to elaborate on your answer.

(2.3) Distinguish Mechanization from Automation. Elaborate on the applicability of these approaches within a factory environment.

Question 03

(3.1) Discuss the types of industrial plant in manufacturing industry. Give examples for each of the types of industrial plant.

(3.2) What are the types of automaton strategies applied in automating plant in question (3.1) above? Justify your answer.

(3.3) Explain the role played by computers in automation of manufacturing industries.

Question 04

(4.1) What is an instrumentation system? Explain the role of sensors in an instrumentation system.

(4.2) What are the factors that you would consider in selecting a sensor for a particular application? Explain by taking an appropriate example.

(4.3) Briefly describe at least five (05) static characteristics of sensors used in instrumentation systems.

Question 05

(5.1) What are tactile sensors? Explain the applicability of such sensors in industry.

(5.2) What are the types of sensors available for detecting the position of an object in an industrial process? Briefly explain the operation of one such sensor.

(5.3) Explain the principle and function of a Resistance Temperature Detector (RTD).

Question 06

(6.1) Discuss the importance of communication networks in industrial automation.

(6.2) Explain, with an aid of a neatly drawn diagram, the configuration of an industrial communication system.

(6.3) Compare and contrast device buses from process busses in relation to industrial communicating systems.

Question 07

(7.1) Distinguish NC machines from CNC machines in the context of their programmability.

(7.2) Why are CNC machines considered to be a vital element in industrial automation? Elaborate on your answer by taking suitable examples.

(7.3) Explain how velocity loop and position loop control schemes achieve axes control in CNC machines.

Question 08

Write brief notes on the following topics given below.

(i) Applicability of open loop vs. closed loop control schemes.

(ii) Advantages of fluid actuation systems in industrial automation.

(iii) Importance of SCADA systems.

(iv) Star vs. ring topology as applied in industrial communication topologies.

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