Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Science and Technology Degree Programme
1st Semester Examination –March/April 2013

Uva Wellassa University

SCT 463-2 Industrial Automation

Instructions to candidate
Number of questions: Four (04)
Answer all questions
Time allocation: Two (02) hours
Total marks allocated: 100

1.

a. Write down three (03) assorted processes that use computers in an automated manufacturing factory.

(03 marks)

b. Name the components used in automation. Give two examples for each.

(05 marks)

c. Briefly describe five (05) factors to be considered when selecting an appropriate relay for a particular application.

(05 marks)

d. Write down one application each using the following conditions of relay.

i. Normally open contact
ii. Change over or double through contact
iii. Single pole double throw
iv. Double pole double throw

(04x03 marks)

2.

a. Explain why a stop button must be normally closed and a start button must be normally open in an electronic device.

(04 marks)

b. Draw a ladder diagram that will cause output (D) to go "true" when switch (A) and switch (B) are closed or when switch (C) is closed.

(06 marks)

c. A buffer can hold up to 10 parts. Parts enter the buffer on a conveyor. As parts arrive they trigger an input sensor "S_1". When a part is removed from the buffer they trigger the exit sensor "S_2". The conveyor should stop when the buffer is full, and resume it when there are fewer than 10 parts in the buffer. The system should also include a start and stop button. Draw a ladder Diagram for this sequence.

(15 marks)

3.

a. Compare the functionality of the through beam, diffuse and retro reflective optical sensors. You may give one (01) example each for their industrial application.

(04 marks)

b. Select most suitable sensors for the applications given below. Give reasons for your selection.

i. To monitor the winding of motors.
ii. To identify the direction of a rotating wheel.
iii. To monitor paper alignment going through a photocopy machine.
iv. To Sort objects of different colors.
v. To Sort objects according to different heights.
vi. To waste water flow control.
vii. To monitor edges of a work piece.

(07x03 marks)

4.

a. Write down the components of a compressed air service unit and briefly explain the functionality of each component.

(05 marks)

b. What are the factors to be considered when selecting appropriate pneumatic cylinders?

(05 marks)

c. Select suitable pneumatic actuators that can be used to deliver the following tasks. Briefly explain how you can deliver the required task using selected actuator/actuators.

i. To pick a part and place it on a perpendicular position to the initial position.
ii. To sort wooden parts of different heights which are coming along a conveyor belt.
to separate containers.
iii. Stamp a label on a wooden box.

(03x05 mark)