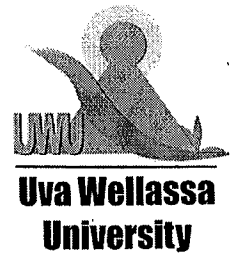


Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Science and Technology Degree Programme
1st Semester Examination –March/April 2013



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.
- Write down three (03) assorted processes that use computers in an automated manufacturing factory. (03 marks)
 - Name the components used in automation. Give two examples for each. (05 marks)
 - Briefly describe five (05) factors to be considered when selecting an appropriate relay for a particular application. (05 marks)
 - Write down one application each using the following conditions of relay.
 - Normally open contact
 - Change over or double through contact
 - Single pole double throw
 - Double pole double throw(04x03 marks)
- 2.
- Explain why a stop button must be normally closed and a start button must be normally open in an electronic device. (04 marks)
 - 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 "S₁". When a part is removed from the buffer they trigger the exit sensor "S₂". 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)