Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018

COURSE NAME	:	AUTOMATION SYSTEM
COURSE CODE	:	BNJ 30803
PROGRAMME CODE	:	BNK
EXAMINATION DATE	:	JUNE / JULY 2018
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWERS **FOUR (4)** QUESTIONS ONLY

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THIS QUESTION PAPER CONSISTS OF **SEVEN (7)** PAGES

Q1 (a) Explain **THREE (3)** categories in terms of the human participation in the processes performed by the manufacturing system.

(6 marks)

(b) Propose three phase how to introduce of new products use automation migration strategy.

(7 marks)

(c) Discuss classification or types of industrial automation.

(12 marks)

Q2 (a) Differentiate between hydraulic and pneumatic automation system.

(6 marks)

(b) **Figure Q2 (b)** shows the basic circuit hydraulic system of a machine. List the components according to a given letter. Explain the operation of the machine work.

(9 marks)

(c) The main purpose of the circuit "bleed off" is to control the flow pressure of the pump does not respond directly to the load. Develop the circuit.

(10 marks)

Q3 (a) The latching or self holding circuit is used for ensuring the supply of electricity to the electro pneumatic components. Illustrate **ONE(1)** example of circuit that apply latching concept.

(10 marks)

(b) A packaging labeling machine uses two double acting pneumatic cylinders. The first cylinder extends fully and sticks the label on to a medicine bottle. This pneumatic cylinder will return after the full extension is acknowledged. Then, a second double acting cylinder will extend and push the labeled bottle away. Develop the electro pneumatic circuit and the displacement diagram.

(15 marks)

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Q4 (a) Explains between logic control and sequencing for the categories of discrete control.

(5 marks)

(b) **Figure Q4(b)** shows an automatic packaging machine for packing ten apples in one box. An counter use to count the number of apples. Refer the device list as shown in the **Table 4(b)**, shows the ladder diagram (Program control circuit) and working operation.

(20 marks)

Q5 (a) List **NINE (9)** principles of material handling.

(9 marks)

(b) A unit load is the single item picked up and moved between two locations. Propose the steps that must be taken when to design the unit load.

(6 marks)

(c) Discuss the transportation system components for material handling below:

(i) conveyors
(ii) industrial vehicles/truck
(iii) monorails, elevator, cranes and hoists
(iv) auxiliary

(10 marks)

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Q6 (a) Propose the reasons why we need to use robot in the packaging industry

(5 marks)

(b) **Table Q6 (b)** shows the device list used at a plant and **Figure Q6 (b)** shows a simulation automatic packaging machine. The machine is designed to move a object from P4 → P3, object from P5 → P6, object from P2 → P4 and object from P6 → P7.

Based on the sequence operation of one manufacturing cell which is control by robot, develop:

(i) the programming file (MB4 file)

(15 marks)

(ii) the programming until object back to original position.

(5 marks)

- END OF QUESTIONS -

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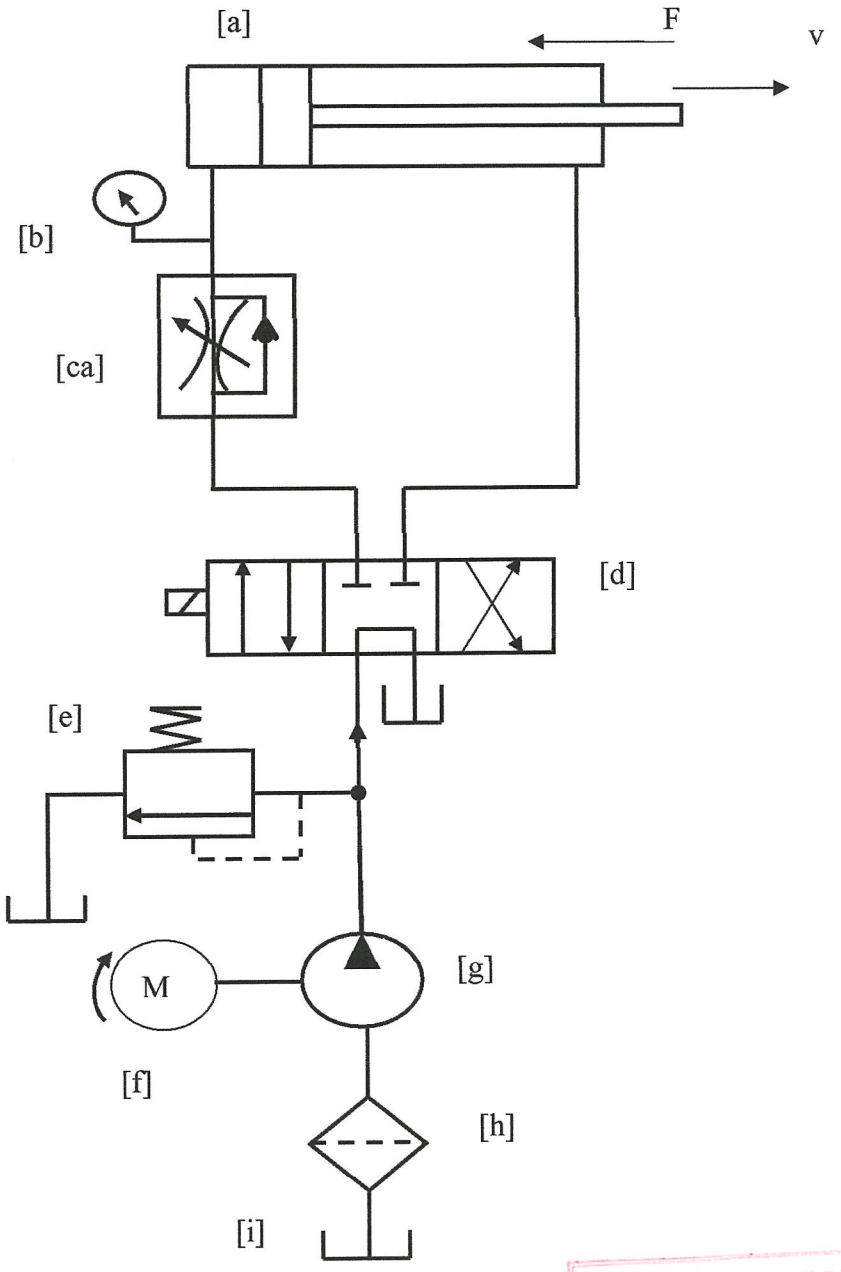

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Figure Q2 (b)

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Table Q4 (b): Device list

Device	Function
IR000.00	Start button: NO button
IR000.01	Stop button: NC button
IR010.01	Box Sensor: to take the box when motor of an conveyor is activated by start button
IR010.00	Apple Sensor: conveyor with apple starts moving when a box is detected by box sensor
IR000.02	Apple sensor: allow counter to count 10 apples
IR000.03	Box sensor: to resets counter which is again ready to count 10 apples.
CNT010	Counter: to count the numbers of apples depend on setting

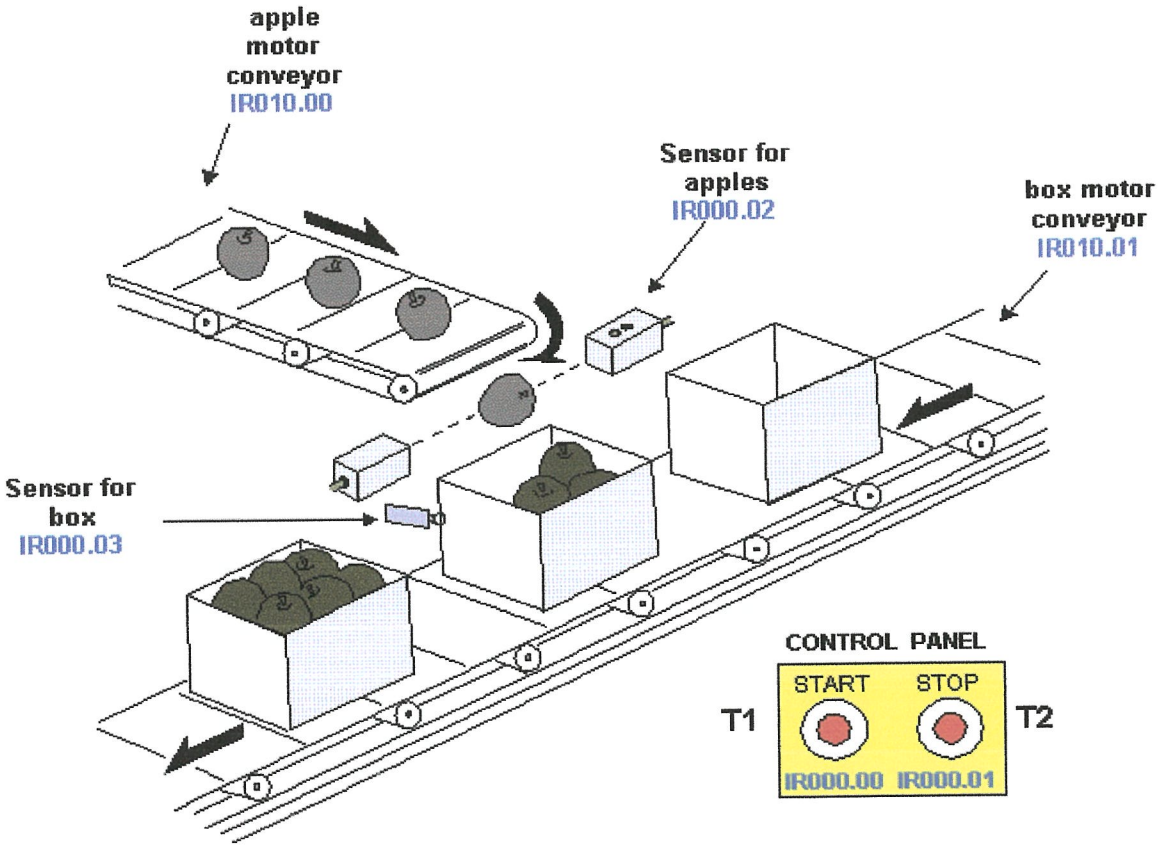

Figure Q4 (b)

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Table Q6 (b): Device list

Num. Item	Device	Num. of Unit
1	Robot arm	1
2	Conveyor	2
3	Table	2
4	CNC Machine (P3)	1

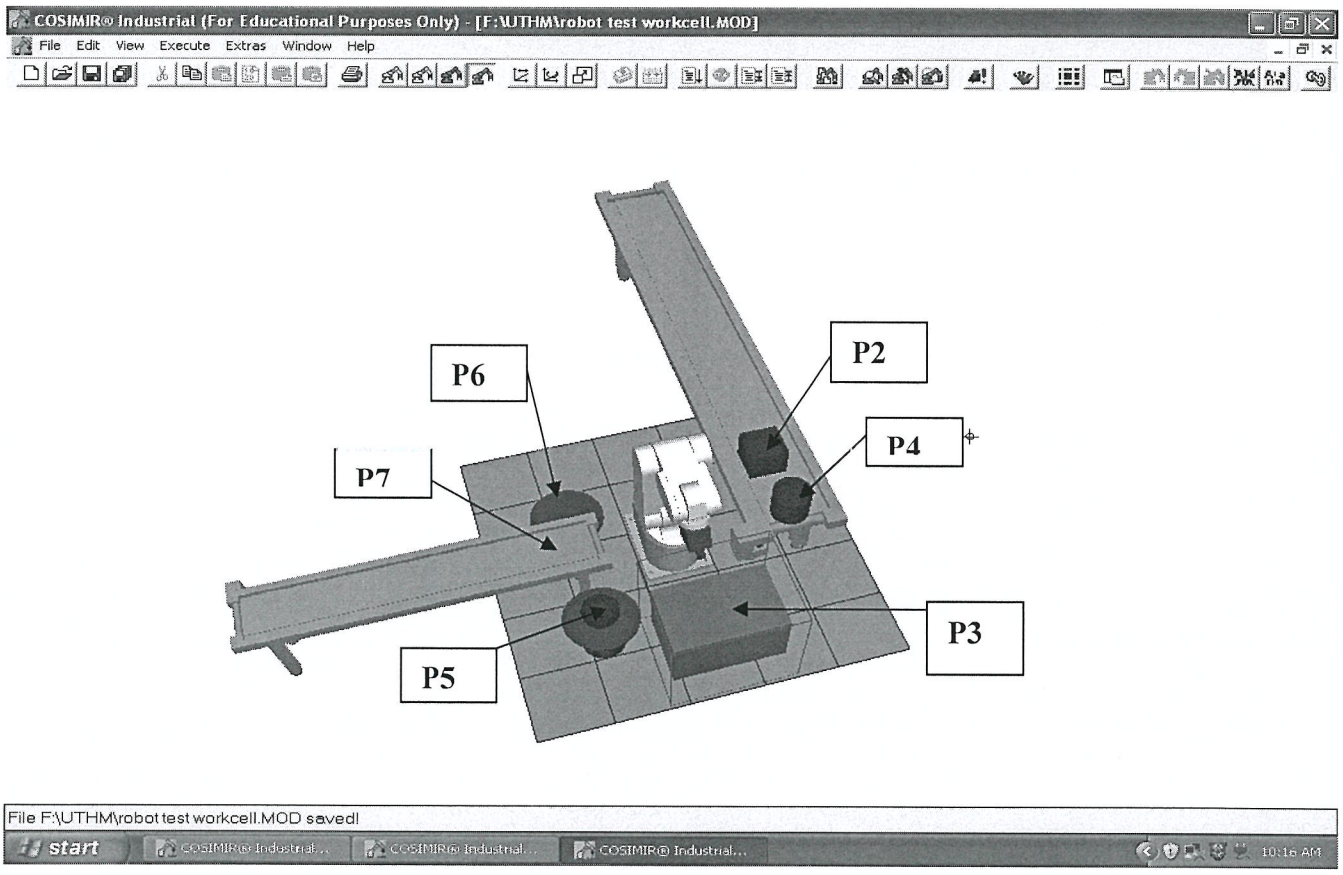

Figure Q6 (b)

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