



UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: DMT 1073
COURSE	: AUTOMATION TECHNOLOGY
SEMESTER/SESSION	: 1- 2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 4 questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

- a) Give 6 (six) benefits of automation technology system. (6 marks)
- b) Explain 3 (three) elements of an automated system. (3 marks)
- c) By using the block diagram, explain each of the following:
- i) Open loop control system. (5 marks)
 - ii) Close loop control system. (5 marks)

QUESTION 2

- a) i) Give 3 (three) presence detection sensors. (3 marks)
- ii) Explain how reed switch works and draw the reed switch symbol. (5 marks)
- iii) Explain how Inductive proximity sensor works, and draw Inductive proximity symbol. (5 marks)
- b) Give two (two) of linear/cylinders actuators in pneumatics system. (4 marks)
- c) Figure 1 shows the metal plate cutting machine, if the Start Switch is pressed cylinder 1 will extend and the cutting process occurs, if the stop switch is pressed Cylinder 1 will return to its original place.

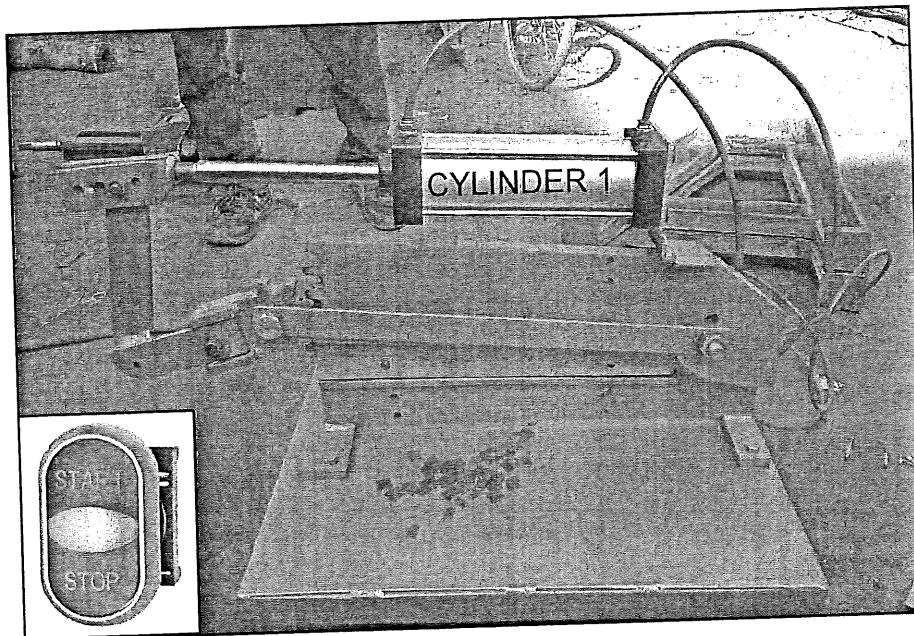


Figure 1

Hint: 5/2 way double solenoid valve should be used

- i. Give all the component to be used. (4 marks)
- ii. Sketch an electro pneumatic circuit diagram to solve the above problem. (12 marks)
- iii. Label all the ports designations. (2marks)

QUESTION 3

a) Draw the symbol of double solenoid valve. (2 marks)

b) As shown in figure 2, a conveyor belt transports metal swarf into a tipping container. When the container is full, it is emptied into a truck. A double-acting cylinder is used for this purpose, activated by a manual-actuated 4/2-way valve. The piston rod of the cylinder is advanced while the container is in position to receive swarf.

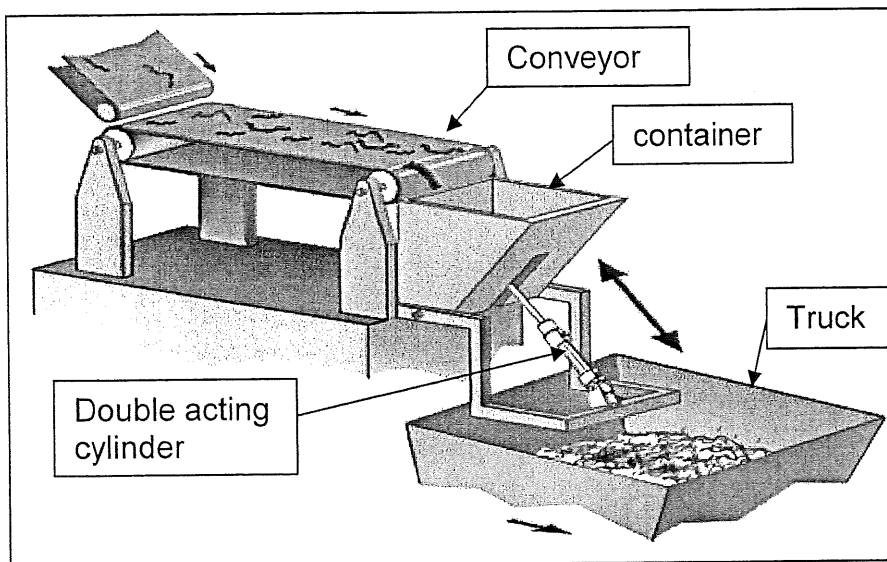


Figure 2

- i) List component to be used. (2 marks)
- ii) Produce a hydraulic circuit diagram to solve the above problem and label all lettering/numbering for hydraulic/pneumatic system. (5 marks)
- iii) Describe the operation of the hydraulic circuit of above in question 3 (b). (5 marks)

QUESTION 4

- a) Draw the 5/2-way double solenoid valve. (3 marks)
- b) Give 5 (five) advantages of PLC compare to relay logic machines. (10 marks)
- c) Give 5 (five) parts of a PLC should have. (5 marks)
- d) Figure 3 shows a mixer process machine, control by PLC, a mixer motor automatically stir the liquid in a vat when the temperature and pressure reach preset values.

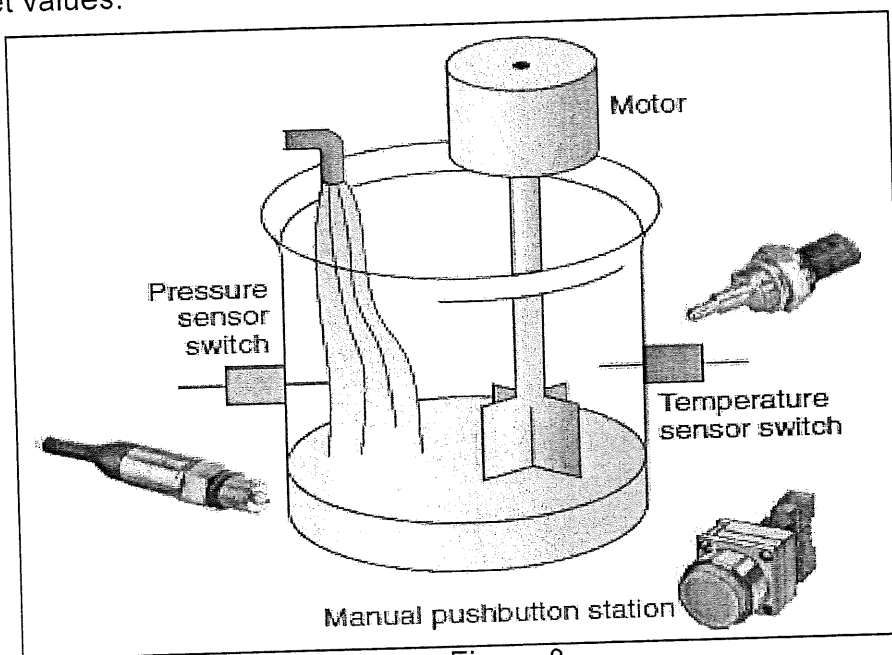


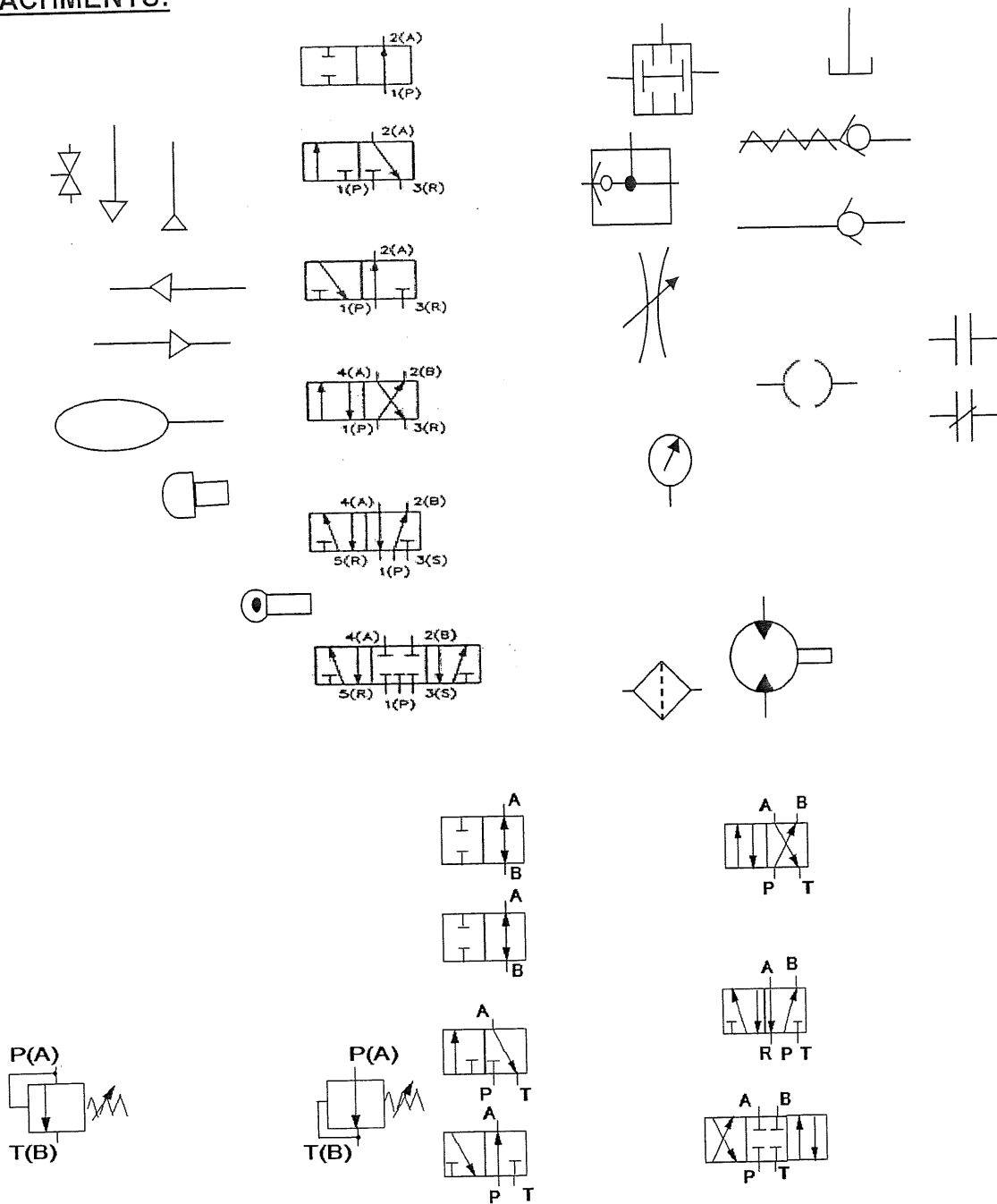
Figure 3

- i) List component to be used. (4 marks)
- ii) Produce a PLC programming (LDR) for above problem. (5 marks)
- iii) Describe the operation of the hydraulic circuit of above in question 4 (d). (5 marks)

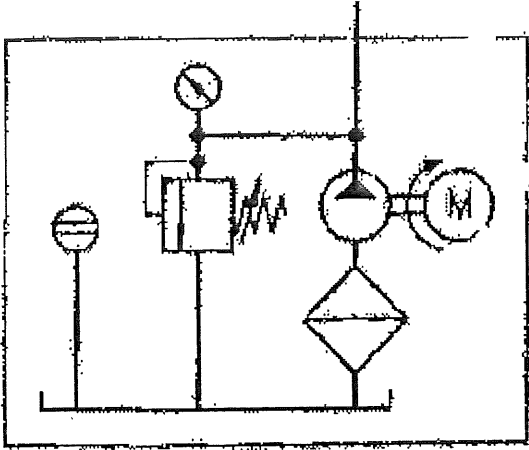
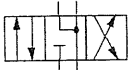
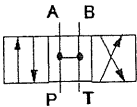
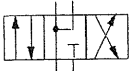
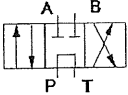
-----End of questions-----

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ATTACHMENTS:



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