

**UNIVERSITY COLLEGE TATI (UCTATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: DEI 2022
COURSE	: ELECTROPNEUMATIC
SEMESTER/SESSION	: 1-2024/2025
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

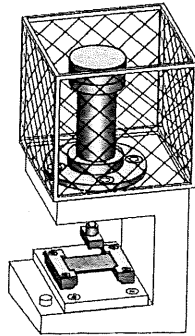
THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

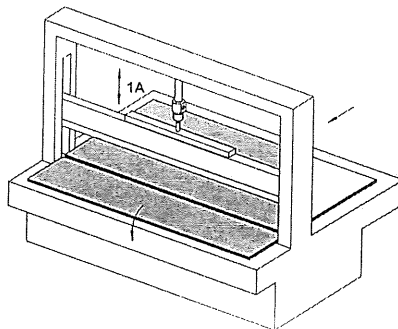
- a) List an example for each audio and visual indicator (2 marks)
- b) Draw the symbol of Pneumatic-electric (PE) Converter (3 marks)
- c) Draw the symbol of 5/2 way single solenoid valve (2 marks)
- d) Draw the symbol of roller (**actuated**) limit switch (2 marks)

QUESTION 2

- a) For safety reason, an operator needs to press two pushbuttons simultaneously in order to operate a stamping machine as in **Figure 1**. A double acting cylinder at the stamping machine will extend if both pushbuttons are pressed simultaneously. Cylinder will retract to initial position when either of the pushbutton is released. For this problem description,
- i) Illustrate the pneumatic circuit diagram with correct numbering (4 marks)
 - ii) Design the electrical circuit diagram with correct labelling (9 marks)

**Figure 1:** Stamping machine

- b) A cutting device as in **Figure 2** is using indirect actuation with double solenoid valve. The cutting blade is advanced by pressing a pushbutton (PB1). The blade is remained in extended position until another pushbutton (PB2) is pressed. For this problem description,
- i) Illustrate the pneumatic circuit diagram with correct numbering (7 marks)
 - ii) Design the electrical circuit diagram with correct labelling (12 marks)

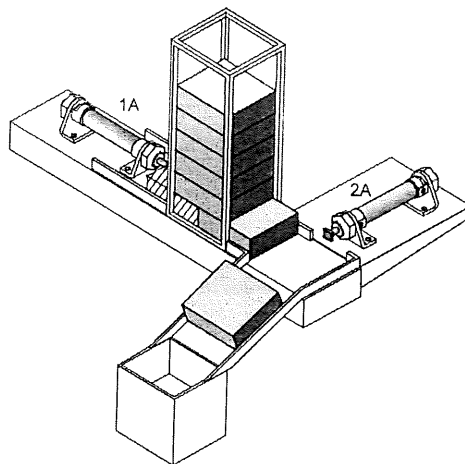
**Figure 2:** Cutting device

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- c) Illustrate the latching circuit consists of a NO pushbutton switch, a relay and a relay contact (5 marks)
- d) List **THREE (3)** logic functions in electropneumatic (3 marks)
- e) Illustrate an electrical circuit for **dominant off** (6 marks)

QUESTION 3

- a) State a problem that might occur for multiple actuator circuit (2 marks)
- b) Two cylinders are used to transfer the boxes. When a pushbutton is pressed, cylinder 1A will extend, pushing the box from the magazine. Once transferred, cylinder 2A will extend to push the blocks into the box. Then cylinder 1A retracts, followed by cylinder 2A. Confirmation of all extended and retracted position is required.
- i) Develop a complete step diagram for this problem description (12 marks)
- ii) Design the electrical circuit diagram for multiple actuator circuit (20 marks)

**Figure 3: Transfer station**

- c) State any disadvantage of using limit switch with idle return (2 marks)

QUESTION 4

- a) State **TWO** (2) preventive measures to reduce frequent malfunctions, failure and downtime (3 marks)
- b) State **THREE** (3) environmental influences which may accelerate wear and tear on components (6 marks)

-----End of question-----