DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, APRIL - 2025

INDUSTRIAL AUTOMATION AND MECHATRONICS

[Maximum marks: 100]   [Time: 3 Hours]

PART – A
Maximum marks: 10

I.   (Answer *all* the questions in one or two sentences. Each question carries **2** marks)

1. Define automation.

2. What is an incremental encoder?

3. Name any two sensors used for measuring temperature.

4. What is the use of direction control valve?

5. Explain the use of internal relays in a PLC program.   (5 x 2 = 10)

PART – B
Maximum marks: 30

II.   (Answer any *five* of the following questions. Each question carries **6** marks)

1. What are the reasons for industrial automation?

2. List the advantages and disadvantages of mechatronics products.

3. Explain with working of an absolute optical encoder.

4. Explain with a neat sketch the working of a pneumatic system.

5. Explain with a neat sketch the working of pressure sequence valve.

6. Explain the jump control in a PLC program.

7. Distinguish between microprocessor and micro controller.   (5 x 6 = 30)

PART – C
Maximum marks: 60
(Answer *one full* question from each unit. Each full question carries **15** marks)

UNIT – I

III. (a) Differentiate between open loop and closed loop control system.   (8)

      (b) Explain with a block diagram, the working of a mechatronics system.   (7)

<center>**OR**</center>

IV. (a) What are the advantages of industrial automation? (8)

(b) What are the advantages of mechatronics system? (7)

<center>**UNIT - II**</center>

V. (a) Explain with a neat sketch, the working of a float sensor. (8)

(b) What are the factors to be considered for the selection of a sensor? (7)

<center>**OR**</center>

VI. (a) Explain with a neat sketch, the working of a phototransistor. (8)

(b) Explain the working of a resistance temperature detectors. (7)

<center>**UNIT - III**</center>

VII. (a) Explain with a neat sketch the working of a hydraulic double acting cylinder. (8)

(b) Explain with a neat sketch the working of a stepper motor. (7)

<center>**OR**</center>

VIII. (a) Explain with a neat sketch the working of a pressure relief valve. (8)

(b) Explain the working principle of a Triac as a solid state switch. (7)

<center>**UNIT – IV**</center>

IX. (a) Explain the different input-output processing methods in a PLC. (8)

(b) Explain the possible design solutions for a bath room scale. (7)

<center>**OR**</center>

X. (a) Explain the use of timers in a PLC program. (8)

(b) What are the common hardware faults in a mechatronics system? (7)

<center>-------------------</center>