

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

**PROCESS CONTROL INSTRUMENTATION**

[Maximum marks: 75]

[Time: 3 Hours]

**PART A**

**I. Answer all the following questions in one word or one sentence. Each question carries 1 mark.**

**(9 x 1 = 9 Marks)**

		Module outcome	Cognitive level
1	The variable oscillations above and below the setpoint value is known as .....	M1.03	U
2	The reference value of the variable is known as .....	M1.01	R
3	When error value is a constant, the output of derivative control will be .....	M2.03	U
4	Write two methods for controller tuning.	M2.04	R
5	Draw the diagram of air to open and air to close control valve.	M3.03	U
6	Write the function of booster relay.	M3.04	U
7	Reset rate $T_I = \dots\dots\dots (K_I, 10 / K_I, 1 / K_I, K_I / 10)$	M2.03	U
8	Write two benefits of HART.	M4.04	R
9	Draw a comparator using op-amp.	M4.01	U

**PART B**

**II. Answer any eight questions from the following. Each question carries 3 marks.**

**(8 x 3 = 24 Marks)**

		Module outcome	Cognitive level
1	Explain self-regulation with suitable example.	M1.03	U
2	Draw the block diagram of process control.	M1.02	U
3	Write short notes about continuous process.	M2.01	R
4	What is multi position control mode?	M2.02	U
5	Define control valve coefficient.	M3.03	U
6	Explain Pneumatic Actuator with neat diagram.	M3.02	U
7	Draw Motion balance telemetry system.	M4.02	U
8	Explain the concept of field bus.	M4.03	R
9	What is offset?	M2.03	U
10	Explain cavitation and flashing.	M3.03	U

**PART C**

**Answer all questions. Each question carries seven marks.**

**(6 x 7 = 42 Marks)**

		<b>Module outcome</b>	<b>Cognitive level</b>
III	Explain the control system parameters (a) Variable range (b) Control lag (c) Dead time  <p align="center"><b>OR</b></p>	M1.02	U
IV	Explain temperature process control system with neat diagram.  <p align="center"><b>OR</b></p>	M1.04	U
V	Draw an electronic PID controller and explain.  <p align="center"><b>OR</b></p>	M2.02	U
VI	Explain the steps of open-loop tuning.  <p align="center"><b>OR</b></p>	M2.04	A
VII	Explain inherent flow characteristics of valves and classification of valves as per the inherent flow characteristics.  <p align="center"><b>OR</b></p>	M3.03	U
VIII	Explain the valve positioner with neat diagram.  <p align="center"><b>OR</b></p>	M3.04	U
IX	Explain the block diagram of telemetry.  <p align="center"><b>OR</b></p>	M4.02	U
X	Explain different layers of HART.  <p align="center"><b>OR</b></p>	M4.04	U
XI	Explain pressure process control system with neat diagram.  <p align="center"><b>OR</b></p>	M1.04	U
XII	Describe Human aided control & Automatic control with suitable example.  <p align="center"><b>OR</b></p>	M1.01	U
XIII	An alarm circuit has 3 inputs <b>A</b> , <b>B</b> and <b>C</b> . Draw the logic diagram using basic gates for the conditions <b>111</b> , <b>011</b> and <b>010</b> for the alarm to turn <b>ON</b> .  <p align="center"><b>OR</b></p>	M4.01	A
XIV	Explain Profibus DP.  <p align="center"><b>OR</b></p>	M4.03	U

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