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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2023

PROCESS CONTROL

[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 dead time.
2. Identify the equation for proportional controller.
3. Mention the application of an Air-to-Open control valve.
4. List out two advantages of field bus.
5. Define proportional band. (5 x 2 = 10)

PART – B
Maximum marks: 30

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

1. With a neat diagram explain flow process control system.
2. Explain process characteristics.
3. Explain the working of ON/OFF controller.
4. Explain proportional-integral control mode.
5. Draw a solenoid valve and explain its working.
6. Illustrate inherent flow characteristics of a control valve.
7. With a block diagram explain the general telemetry system. (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) With examples describe Human-aided control and Automatic control. (8)

(b) With a diagram describe Temperature process control system. (7)

OR

IV. (a) Describe the elements of process control loop. (8)

(b) With a diagram explain Level control system. (7)

UNIT-II

V. (a) Describe Electronic PID control mode. (8)

(b) Compare P, PI, PD and PID control modes. (7)

OR

VI. (a) Describe Pneumatic PID controller. (7)

(b) Explain multiposition control mode. (8)

UNIT-III

VII. (a) Describe the block diagram of final control element operation. (8)

(b) Explain the working of a pneumatic actuator. (7)

OR

VIII. (a) Describe the working of Force-balance Valve Positioner. (8)

(b) Describe control valve sizing, cavitation and flashing. (7)

UNIT-IV

IX. (a) Illustrate functional elements in foundation field bus. (8)

(b) Describe field bus general characteristics and its important features. (7)

OR

X. (a) With a block diagram describe the working of HART protocol. (9)

(b) Illustrate the basic HART specifications. (6)
