IPCD
PROBABLE QUESTION
ANSWERS
MOD 3 & 4
EE EEE 5TH SEM

1. Optical fiber sensors are electrically _____

a) active

b) passive

c) active as well as passive

d) cannot be determined

View Answer

Answer: b

Explanation: Optical fiber sensors are electrically passive and consequently immune to electromagnetic disturbances. They are geometrically flexible and corrosion resistant. They can be miniaturized and are most suitable for telemetry applications.

6. The type of sensor that detects the analyte species directly through their characteristic spectral properties is called _____

a) chemical sensor

b) thermal sensor

c) light sensor

d) spectroscopic Sensors

View Answer

Answer: d

Explanation: Spectroscopic Sensors is the one that detects the analyte species directly through their characteristic spectral properties. In these sensors, the optical fibre functions only as a light guide, conveying light from the source to the sampling area and from the sample to the detector. Here, the light interacts with the species being sensed.

5. On the bases of application of optic fiber sensor, which of the following is not considered to be the classification of fiber optic sensor?

a) biomedical/photometric sensors

b) physical sensors

c) thermal sensors

d) chemical sensors

View Answer

Answer: c

Explanation: The variations in the returning light are sensed using a photodetector. Such sensors monitor variations either in the amplitude or frequency of the reflected light. Two of the most important physical parameters that can be advantageously measured using fibre optics are temperature and pressure.

6. The type of sensor that detects the analyte

4. In which of the following optic fiber sensor the fiber is simply used to carry light to and from an external optical device where the sensing takes place?

a) extrinsic fiber optic sensor

b) energized fiber optic sensor

c) all fibers are used to simply carry light to and from the external optical devices

d) intrinsic fiber optic sensor

View Answer

Answer: a

Explanation: In an extrinsic fiber optic sensor fiber is simply used to carry light to and from an external optical device where the sensing takes place. In an intrinsic fiber optic sensor, one or more of the physical properties of the fiber undergo a change.

2. Optical fibers are not immune to _____

a) electronic disturbances

b) magnetic disturbances

c) ambient light interference

d) electromagnetic disturbances

View Answer

Answer: c

Explanation: Optical fibre sensors are non-electrical and hence are free from electrical interference usually associated with electronically based sensors. Ambient light can interfere. Consequently, the sensor has to be applied in a dark environment or must be optically isolated.

3. Optical fiber sensors are not immune to electromagnetic disturbances.

a) True

b) False

View Answer

Answer: b

7. How many coils are required to make LVDT?

a) 4

b) 6

c) 3

d) 2

View Answer

Answer: c

Explanation: Total 3 coils are required in LVDT. One centered coil which is the energizing or primary coil connected to the sine wave oscillator. The other two coils are the secondary coils so connected that their outputs are equal in magnitude but opposite in phase.

8. A chemical transduction system is interfaced to the optical fibre at its end. This type of sensor is called?

a) chemical sensor

b) thermal sensor

c) photoelectric sensor

d) light sensor

View Answer

Answer: a

Explanation: In the chemical sensors, a chemical transduction system is interfaced to the optical fibre at its end. In operation, interaction with analyte leads to a change in optical properties of the reagent phase, which is probed and detected through the fibre optic. The optical property measured can be absorbance, reflectance or luminescence.

This set of Instrumentation Transducers Multiple Choice Questions & Answers (MCQs) focuses on “Fibre Optic Sensors”.

1. OTDR stands for _____
a) Optical time domain reflectometer
b) Optical transfer data rate
c) Optical time data registers
d) None of the mentioned

View Answer

Answer: a
Explanation: OTDR is the short form of optical time domain reflectometer.

2. Which of the following is not correct for fibre optic sensors?

a) Immune to electro magnetic interference

b) Immune to radiation hazard

c) Can be used in harsh environments

d) None of the mentioned

View Answer

Answer: d

Explanation: All of the mentioned are qualities of fibre optic sensors.

3. Fluoride glass is used with _____

a) IR waves

b) UV rays

c) Normal light

d) All of the mentioned

View Answer

Answer: a

Explanation: Flouride glass is suitable for IR rays of wavelength upto 3200 nm.

6. Epoxy material in fibre optics is intended for _____

a) Better optical properties
b) Better reflection
c) Better sealing
d) Reducing noise

View Answer

Answer: c
Explanation: Polished epoxy seal provides liquid and air tight seal.

7. Plastics optical cables can be used for _____

a) Short range
b) Medium range of distance
c) Long range of distance
d) Very high range of distance

View Answer

Answer: a
Explanation: Plastic optical cables are manufacturing for short range purposes.

4. Silica glass of hydroxyl concentration can be used for _____ of wavelength.

a) 100 nm to 250 nm

b) 250 nm to 800 nm

c) 800 nm to 1500 nm

d) 100 nm to 3400 nm

View Answer

Answer: b

Explanation: Silica glass with hydroxyl concentration is used for wavelength 250 nm to 800 nm.

5. General spectral range for silica glass is _____

a) Less than 200 nm

b) Between 200 nm to 2200 nm

c) Between 2000 nm to 5000 nm

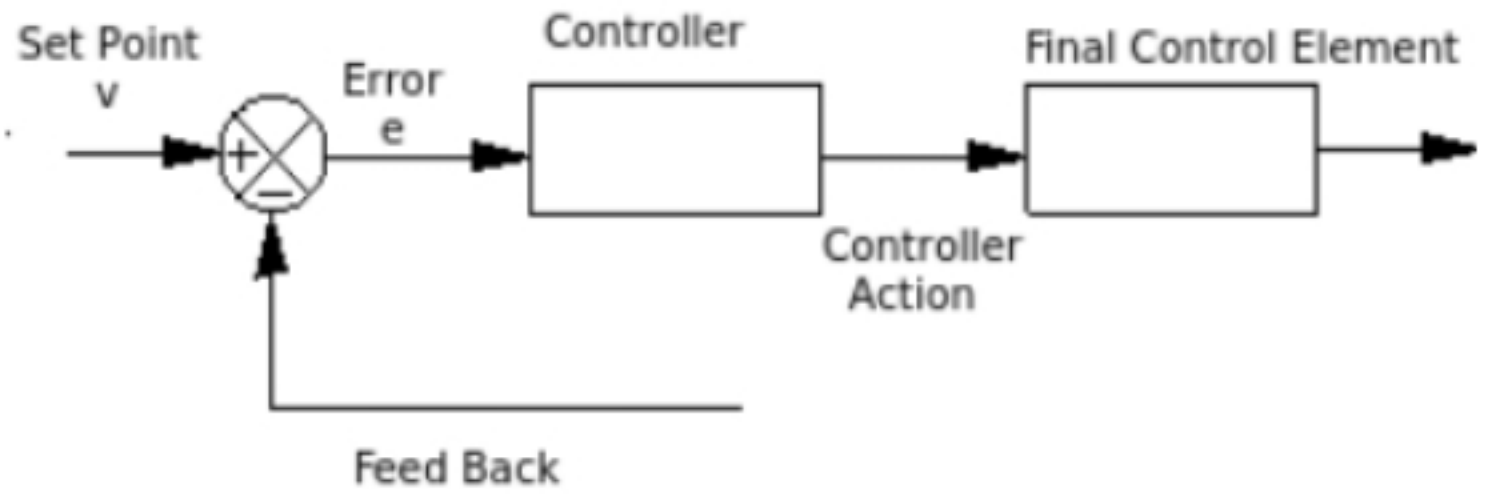
d) Greater than 3000 nm

View Answer

Answer: b

Explanation: General spectral range of silica glass is 200 nm to 2200 nm.

8) Consider the below diagram of Two Position Control. What would be the value of error, when the controller output takes a fixed value corresponding to the 'ON' position of final control element?



a. zero

b. less than zero

c. more than zero

d. unpredictable

Answer | Explanation

ANSWER: more than zero

Explanation:

No explanation is available for this question!

9) On-off Control is also called as .

Explanation:

No explanation is available for this question!

---

9) On-off Control is also called as _____.

a. one position control
b. two position control
c. four position control
d. half position control

Answer | Explanation

ANSWER: two position control

Explanation:

No explanation is available for this question!

---

10) Which of the following is/are the Continuous Control Mode/s used in control systems?

a. On-Off Control
b. Integral Control
c. Proportional Control
d. All of the above

Answer | Explanation

d. half position control

Answer | Explanation

ANSWER: two position control

Explanation:

No explanation is available for this question!

---

10) Which of the following is/are the Continuous Control Mode/s used in control systems?

a. On-Off Control
b. Integral Control
c. Proportional Control
d. All of the above

Answer | Explanation

ANSWER: All of the above

Explanation:

No explanation is available for this question!

---

b. is increasing

c. remains constant

d. is unpredictable

Answer | Explanation

---

7) The controller characteristics for on-off controller follow _____.

a. only one curve

b. two curves

c. four curves

d. unpredictable

Answer | Explanation

ANSWER: two curves

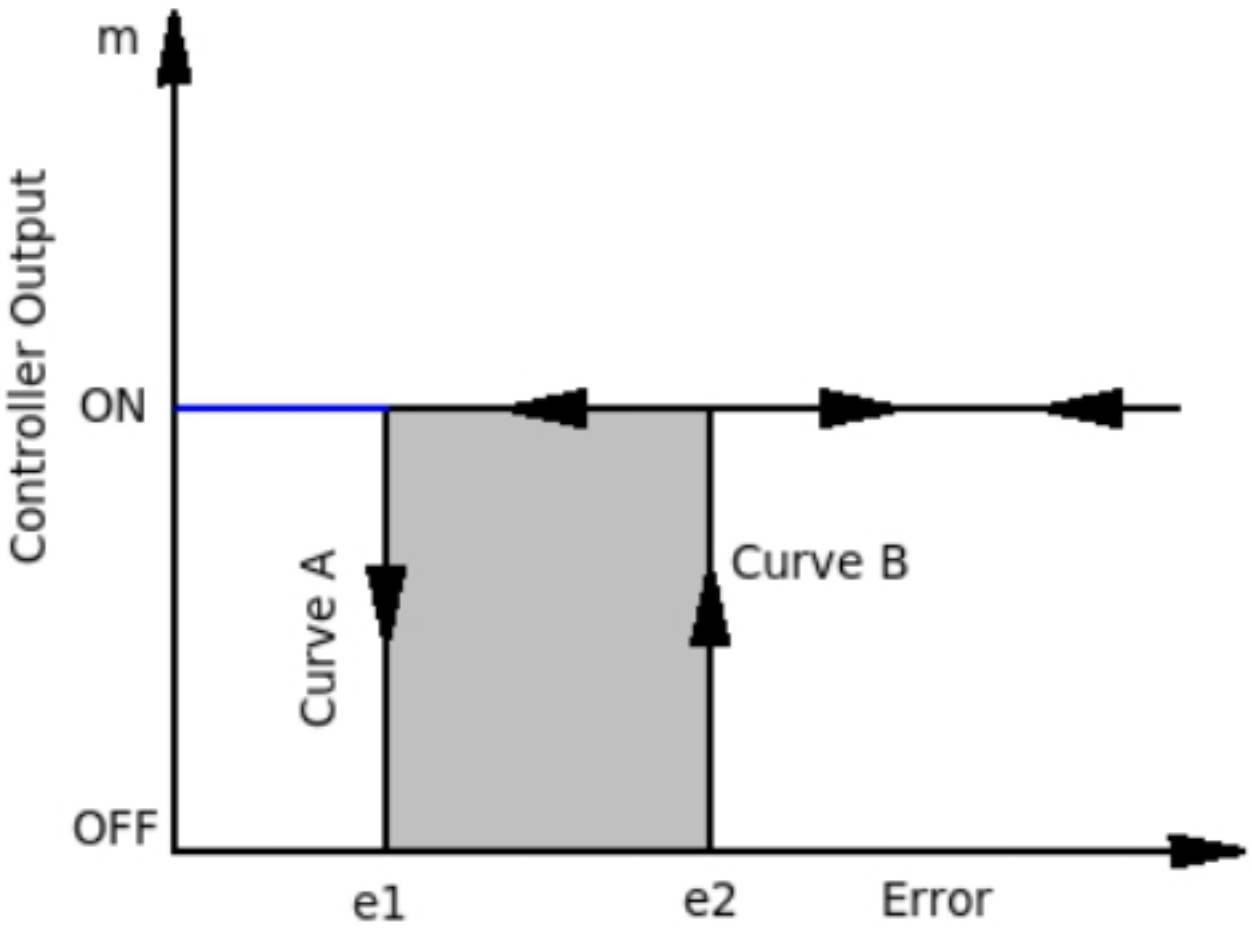
Explanation:

No explanation is available for this question!

---

8) Consider the below diagram of Two Position Control. What would be the value of error, when the controller output takes a fixed value corresponding to the 'ON' position of final control element?

5) Consider the following graph of Controller Characteristics of On-Off Control. The region shown between curve A and curve B is called as_____.



a. dead zone

b. hysteresis

c. both a. and b.

d. none of the above

Answer | Explanation

ANSWER: both a. and b.

Explanation:

No explanation is available for this question!

6) Consider the following graph of error (e) vs controller output (m). The curve B corresponding

4) Which of the following is/are the drawback/s of proportional control?

1. Proportional control system is complicated and costly.
2. Proportional control system is not suitable for pressure temperature and flow control problems
3. If there are sudden disturbance, the proportional control system takes time to stabilize.

a. (1)
b. (2)
c. (3)
d. (1), (2) and (3)

Answer | Explanation

ANSWER: (3)

Explanation:

No explanation is available for this question!

5) Consider the following graph of Controller Characteristics of On-Off Control. The region shown between curve A and curve B is called

3) Shifting of set point and adjusting its new value by the controller, when the value of disturbance increases, is called as_____.

a. set-shift

b. offset

c. stabilization

d. none of the above

Answer | Explanation

ANSWER: offset

Explanation:

No explanation is available for this question!

---

4) Which of the following is/are the drawback/s of proportional control?

1. Proportional control system is complicated and costly.
2. Proportional control system is not suitable for pressure temperature and flow control problems
3. If there are sudden disturbance, the proportional control system takes time to stabilize.

1) The range of control of controller _____ due to presence of offset.

a. increases
b. decreases
c. remains constant
d. cannot say

Answer | Explanation

ANSWER: decreases

Explanation:

No explanation is available for this question!

---

2) If the value of error increases, the changing speed of controller output _____.

a. increases
b. decreases
c. remains constant
d. cannot say

Answer | Explanation

ANSWER: remains constant

Explanation:

No explanation is available for this question!

1. A valve positioner :

a. Takes the place of a cascade control system
b. Provides more precise valve position
c. Makes a pneumatic controller in necessary
d. Provides a remote indication of valve position

Answer: b

2. Assume that a control valve regulates stream flow to a process and that high temperature makes the reaction hazardous. The usual pneumatically operated control valve utilizes the following action for fail-safe operation

a. Air to open
b. Air to close
c. 3 psi (20 kpa) to fully open
d. 15 psi (100 kpa) to fully close

Answer: a

3. The basic function of the spring in a control valve is to

a. Characterize flow
b. Oppose the diaphragm so as to position the valve according to signal pressure
c. Close the valve if air failure occurs
d. Open the valve if air failure occurs

Answer: b

4. A diaphragm actuator has a diaphragm area of 50 square inches and is adjusted to stroke a valve when a 3 to 15 psi (20 to 100 k Pa) Signal is applied. If the signal is 15 psi (100 k pa) the force on the valve stem will be :

a. 750 pounds
b. 750 pounds less than the opposing spring force
c. Dependent on hysteresis
d. None of the above

38. In an automatic control system which of the following elements is not used ?

(a) Error detector
(b) Final control element
(c) Sensor
(d) Oscillator

Ans: d

39. In a control system the output of the controller is given to

(a) final control element
(b) amplifier
(c) comparator
(d) sensor
(e) none of the above

Ans: a

9. One advantage of an electric to pneumatic valve positioner is :

a. It can be used on flow control
b. It produces positive valve position
c. It conserves energy
d. It dampers valve travels

Answer: b

7. A pressure control process using proportional plus integral control has a time constant of 10 seconds. The best choice of actuator would be :

a. An electric motor
b. A pneumatic diaphragm
c. A piston and cylinder
d. A solenoid electrical

Answer: b

8. A diaphragm actuator has a diaphragm area of 115 square inches. A valve positioner is attached to the actuator and fed with 22 psi air supply. If after 9 psi signal is received from the controller the signal changes to 10 psi and the valve fails to move. What is the force applied to the valve stem?

6. An electronic controller creates a 4 to 20mA dc signal that must actuate a steam valve for temperature control. The best and most economical choice would be to :

a. Use an all-electric actuator system
b. Convert to a pneumatic signal at the controller and use a pneumatic actuator.
c. Use pneumatic actuator with an electric to pneumatic valve positioner
d. None of the above

Answer:c

40. A controller, essentially, is a

(a) sensor
(b) clipper
(c) comparator
(d) amplifier

Ans: c

41. Which of the following is the not the ideal input to a controller ?

(a) Servo signal
(b) Desired variable value
(c) Error signal
(d) Sensed signal

Ans: a

42. The on-off controller is a ____ system.

(a) digital
(b) linear
(c) non-linear
(d) discontinuous

Ans: d

43. The capacitance, in force-current analogy, is analogous to

(a) momentum
(b) velocity
(c) displacement
(d) mass

44. The temperature, under thermal and electrical system analogy, is considered analogous to

(a) voltage
(b) current
(c) capacitance
(d) charge
(e) none of the above

Ans: a

45. In electrical-pneumatic system analogy the current is considered analogous to

(a) velocity
(b) pressure
(c) air flow
(d) air flow rate

Ans: d

52. ___ Signal will become zero when the feedback signal and reference signs are equal.

(a) Input
(b) Actuating
(c) Feedback
(d) Reference

Ans: b

53. A signal other than the reference input that tends to affect the value of controlled variable is known as

(a) disturbance
(b) command
(c) control element
(d) reference input

Ans: a

"Quarter-wave damping" may be described as:

(A) a condition of good control where PV approaches SP without overshoot
(B) a condition of poor control where oscillations continue at constant amplitude
(C) a condition of poor control where the transmitter is damped by 25%
(D) a condition of good control where oscillations quickly subside
(E) a condition of excellent control where there are no oscillations

Answer : D

The reciprocal of proportional band is called:

(A) Reset
(B) Percent
(C) Minutes per repeat
(D) Gain
(E) Rate

Answer : D

processes always require some degree of control action to achieve setpoint.

(A) Integrating, Derivative
(B) Integrating, Feedforward
(C) Self-regulating, Proportional
(D) Runaway, Linear
(E) Self-regulating, Integral

Answer : E

The derivative control action is typically used when controlling, but rarely used when controlling.

(A) Temperature, Flow
(B) Flow, Level
(C) pH, Temperature
(D) Level, Temperature
(E) Level, Flow

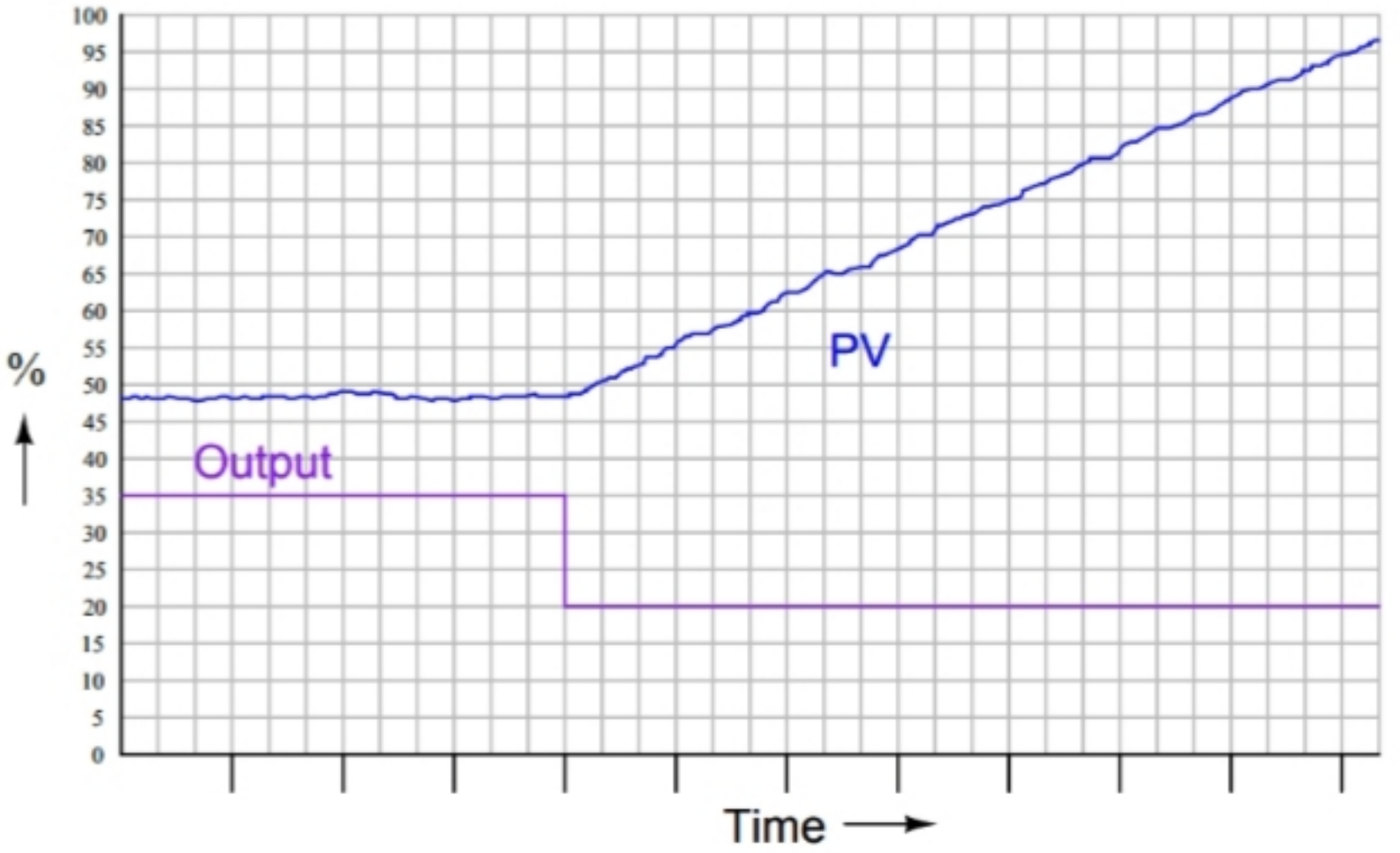
Answer : A

Reset control action is often expressed in units of:

(A) percent
(B) seconds per rate
(C) minutes
(D) time constant ratio (unitless)
(E) repeats per minute

Answer : E

The open-loop response of a process is shown in the following trend. What sort of process is indicated by this behavior?



(A) Integrating
(B) Proportional
(C) Linear
(D) Direct-acting
(E) Self-regulating

Answer : A

A condition where integral control action drives the output of a controller into saturation is called:

(A) self-bias
(B) wind-up
(C) repeat
(D) noise
(E) offset

Answer : B

Fast, self-regulating processes typically respond well to aggressive control action.

(A) Nonlinear
(B) Derivative
(C) Proportional
(D) Reset
(E) Gain

Answer : D

Question 10

Process variable filtering should be used:

(A) to dampen noise
(B) only on integrating processes
(C) to improve response time
(D) only on self-regulating processes
(E) never

Answer : A

Process variable filtering should be used:

(A) to dampen noise
(B) only on integrating processes
(C) to improve response time
(D) only on self-regulating processes
(E) never

Answer : A