

- 3 ____ use semiconductor devices such as bipolar transistors, MOSFETs, SCRs, or triacs.
- 4 The zero of electrical control signal is ____.
- 5 Derivative control mode can not be used alone in the process control industry (TRUE/FALSE).
- 6 Many solid-state relays used to control AC loads have a feature known as zero switching (TRUE/FALSE).
- 7 The rangeability of a control valve is defined as the ratio of maximum controllable flow to minimum controllable flow (TRUE/FALSE).
- 8 Actuators are mechanical or electro-mechanical devices that provide controlled and sometimes limited movements or positioning which are operated electrically, manually, or by various fluids such as air, hydraulic, etc (TRUE/FALSE).

Que 3 Short Answer Questions (Attempt any 10 out of 12).

[20]

- 1 Define: Process lag and Self-regulation.
- 2 The temperature has a range of 300 to 440 K and a set point of 384 K. Find the percent of span error when the temperature is 379 K.
- 3 Write on variable range and control parameter range.
- 4 Give an account of screw compressor.
- 5 Explain briefly liquid piston compressor.
- 6 Explain centrifugal compressor briefly.
- 7 What is relay? Enlist types of relays.
- 8 What is timing relay?
- 9 What is control valve?
- 10 Enlist types of stepper motors.
- 11 How stepper motor works?
- 12 What is an actuator?

Que 4 Long Answer Questions (Attempt any 04 out of 08).

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- 1 What do you mean by discontinuous control system? Write a note on ON-OFF control system.
- 2 What do you mean by continuous control system? Explain proportional control system in detail.
- 3 Explain dryer in detail.
- 4 Write a detailed note on compressor cooling. Also explain instrument air distribution system.
- 5 Write a note on electromechanical control relay with necessary diagram.
- 6 Give an account of solid-state relay with necessary diagram.
- 7 Write a note on permanent magnet stepper motor and variable reluctance stepper motor with necessary diagrams.
- 8 Give advantages of stepper motor. Enlist its applications. Explain hybrid stepper motor in detail with necessary diagram.

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