

VITHALBHAI PATEL & RAJRATNA P. T. PATEL SCIENCE COLLEGE

Vallabh Vidyanagar

Internal Test - First Term [2013 - 14]

Semester - V<sup>th</sup>

B. Sc. (INSTRUMENTATION - VOCATIONAL)

Date: 01/10/2013

Subject: Control Techniques - 1 (US05CINV02)

Time: 3:30 pm - 5:00 pm

Maximum Marks: 30

**Que 1 Each question below gives a multiple choice of answers. Choose the most appropriate one. [06]**

- 1 \_\_\_\_\_ refers to the time for the process - control loop to make necessary adjustments to the final control element.
  - i. Process lag
  - ii. Error
  - iii. Both i) and ii)
  - iv. None of the above
- 2 \_\_\_\_\_ Control Mode is the natural extension of the principle of Floating Control Mode.
  - i. Propotional
  - ii. On - Off
  - iii. Derivative
  - iv. None of the above
- 3 The pressure levels used for instrument air systems vary from about \_\_\_\_\_.
  - i. 0.4 psig to 0.12 psig
  - ii. 4 psig to 12 psig
  - iii. 4 psig to 20 psig
  - iv. None of the above
- 4 \_\_\_\_\_ is a temporary variation of one of the load parameters.
  - i. Error
  - ii. Self - Regulation
  - iii. Cycling
  - iv. None of the above
- 5 \_\_\_\_\_ Control Mode: Controller output depends on the rate of change of error.
  - i. Single Speed
  - ii. Integral
  - iii. Propotional
  - iv. None of the above
- 6 Factors that should be considered in designing instrument air system is/are \_\_\_\_\_.
  - i. Temperature
  - ii. Humidity
  - iii. Vapour Pressure
  - iv. None of the above



**Que 2 Short Questions (Attempt any Three) [06]**

- 1 Define Variable Range and Control Lag.
- 2 What is Continuous Control Mode?
- 3 What is Dryer?
- 4 What do you mean by Direct Action and Reverse Action of Control Mode?
- 5 What do you mean by Composite Control Mode?
- 6 Enlist the factors that should be considered in designing instrument air systems.

**Que 3 Write a note on Two - Position Control Mode. What is Neutral Zone? [06]**

OR

What do you mean by Discontinuous Control Mode?

A controller outputs a 4 - 20 mA signal to control motor speed from 140 - 600 rpm with linear dependence. Calculate:

- i. Current corresponding to 310 rpm, and
- ii. Value of i) expressed as the % of controller output.

**Que 4 Write a note on Propotional Control Mode. What is offset? [06]**

OR

An Integral Control Mode is used for speed control with set point of 12 rpm within a range of 10 - 15 rpm. The controller output is 22% initially. The constant  $K_I = -0.15$  controller output per second per percentage error. If the speed jumps to 13.5 rpm, calculate controller output after 2 second for a constant  $e_p$ .

**Que 5 Explain Sliding Vane Rotary Compressor. [06]**

OR

Discuss Dynamic Compressor.