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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, December – 2020

(Seventh Semester)

BEIOE 7052 – INDUSTRIAL AUTOMATION AND CONTROL

(Chemical Engineering)

Time: 2 hrs

Maximum: 50 Marks

The figures in the right hand margin indicate marks.**PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)****Q.1. Answer ALL questions**

- a. For proper feedback in a process control element, it is required to _____
- (i) measure P (ii) measure set point
(iii) measure error (iv) measure comparator
- b. Which controller has the potential to eliminate/overcome the drawback of offset in proportional controllers?
- (i)P-I (ii)P-D
(iii)Both a and b (iv)None of the above
- c. Proportional band of the controller is expressed as:
- (i) Percentage (ii) Range of control variables
(iii)Gain (iv) Ratio
- d. The most dramatic application of feedforward techniques has occurred in their application to:
- (i) Heat exchangers (ii) Level processes
(iii) Flow processes (iv) Distillation columns
- e. The ratio controller
- (i) Can be used with any combination of related process variables (ii) Has one measurement input and two outputs
(iii) Can be used for even-numbered ratios (iv) Must always employ the derivative mode in the controller
- f. Semaphore is a/an _____ to solve the critical section problem.
- (i) hardware for a system (ii) special program for a system
(iii) integer variable (iv) none of the mentioned
- g. Interrupt latency refers to the period of time _____
- (i) from the occurrence of an event to the arrival of an interrupt (ii) from the occurrence of an event to the servicing of an interrupt
(iii) from arrival of an interrupt to the start of the interrupt service routine (iv) none of the mentioned
- h. Which of the following is used to heat the feed water by using waste heat of flue gases?
- (i) Air preheater (ii) Super heater
(iii) Economizer (iv) Steam separator
- i. The devices used for flow obstruction are:
- (i) Orifice plate (ii) Venturi tube
(iii)Flow nozzle and dall flow tube (iv) All of these
- j. Hard real time operating system has _____ jitter than a soft real time operating system.
- (i) less (ii) more
(iii) equal (iv) none of the mentioned

PART – B: (Short Answer Questions)

(2 x 5 = 10 Marks)

Q.2. Answer ALL questions

- a. Draw the Cohen-coon tuning loop configuration with process reaction curve.
- b. What is the role of IP (index of performance) in adaptive control system?
- c. What is the difference between relay diagram and ladder diagram?
- d. What are the advantages of DCS?
- e. Define Zener Barrier.

PART – C: (Long Answer Questions)

(6 x 5 = 30 Marks)

Answer ANY FIVE questions

Marks

3. Define briefly the dynamic characteristics of PI, PD and PID controller. (6)
4. What is the need of tuning in PID Controller .Also explain Zeigler-Nichols Tuning Method and process reaction curve briefly. (6)
5. The temperature of a furnace is to be controlled. The rate of flow of fuel to the furnace is the manipulated variable. Pressure of the fuel is the secondary variable. Draw a cascade scheme for this system. (6)
6. Explain the use of feed forward control for a heat exchanger. (6)
7. Discuss the mailbox function for Inter Task Communication using flow chart. (6)
8. Write the difference between Distributed and Central Control system with its advantages and disadvantages. (6)
9. Describe the Power plant cycle by drawing a schematic diagram of the same and indicate in it the positions of measurement in flow in the cycle. (6)
10. Explain the term NEMA and IP. What specifications do make in relation to hazards and safety? (6)

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