Register Number: ……..

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Fifth Semester

MECHATRONICS ENGINEERING

MCT107**:** Processes Control and Instrumentation

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Measuring the length of a line is a type of
   a) Primary measurements b) Secondary measurements
   c) Tertiary measurements d) Electronic measurements
2. Pico is what relation to micro?
   a) One tenth b) One hundredth
   c) One thousand d) One millionth
3. Which of the following is the most common final control element in process control industries
   a) agitator b) Pump motor
   c) valve d) louver
4. In RTD, platinum is used for the below temperature range
   a) -210 to 110 degree b) 0 to 220 degree
   c) 0 to 180 degree d) 120 to 360 degree
5. Ring balance manometer measures
   a) Differential pressure b) Absolute pressure
   c) Gauge pressure d) Atmospheric pressure
6. Velocity of fluid can be measured using
   a) Hot wire anemometer b) Bellows
   c) Bourdon tube d) Manometer
7. A cascade control system has
   a) Single loop b) Loops with in loop
   c) Single controller d) Overlapping loops
8. Feed forward control scheme is also referred as
   a) Post factor control b) Inferential control
   c) Anticipating control d) Predetermined control
9. The disadvantage of proportional control is
   a) To reduce oscillation b) To settle it fast
   c) Nullify the offset d) offset
10. An example for integrating process
    a) Liquid level process with constant flow outlet b) Mercury thermometer
    c) Heat exchanger d) Stirred tank heater

PART B (10 x 2 = 20 Marks)

11. List any four objectives of process control.
12. Why do we need mathematical modeling of process?
13. What is bonded foil strain gauge?
14. What is meant by self heating error in resistance thermometer?
15. Draw the temperature compensation circuit of a straingauge?
16. What are the different transfer characteristics of the transducer?
17. Explain the purpose of cascade control for heat exchangers.
18. Differentiate split range and selective control.
19. Give an example for continuous and discontinuous mode of controller.
20. Define proportional band.

PART C (5 x 14 = 70 Marks)

21. a) Explain the static and dynamic characteristics of instruments.

(OR)

b) Determine the time response of a second order system when it is subjected to step input plot the response.

22. a) Write a brief note on
    i) Piezoelectric transducer (7)
    ii) Strain gauge (7)

(OR)

b) Write a short note on
   i) Liquid filled thermometers (7)
   ii) Gas filled thermometers (7)

23. a) Explain the operation of orifice meter and venturimeter with neat sketches.

(OR)

b) Explain any two pressure measurement techniques. Mention its advantages and disadvantages.

24. a) Discuss about the following process control

i) Feed forward control (7)

ii) Split range control (7)

(OR)

b) Explain P, PI, PD, PID controllers with neat diagrams and explanations.

25. a) Explain about pneumatic and electronic PID controllers.

(OR)

b) What is stepper motor? Explain the different types of stepper motor and list the specifications in detail.

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