A   Reg. No. :

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Dead zone is the   CO1- R

   (a) Same as time   constant   (b) Same as transportation lag

   (c) Maximum change in the variable that does not   (d) None of the above

      change the reading of the instrument

2. Thermocouple in a thermal well behaves as a true   CO1- R

   (a) first order system   (b) multiple first order system

   (c) second order system (overdamped)   (d) second order system (underdamped)

3. The standard measured indication range of a transducer is 4-20mA.   CO2- App
   If we have a set point value of 11mA and a measurement of
   11.5mA,calculate the error expressed as percent of span

   (a) -3.125%   (b) 3.125%   (c) 31.25%   (d) -31.25%

4. _____ controller is an example of discontinuous controller mode   CO2- U

   (a) Proportional control   (b) Integral control

   (c) Derivative control   (d) ON/OFF control

5. The equation of ITAE is   CO3- U

   (a) $\int_0^\infty |e(t)|dt$ (b) $\int_0^\infty t\,|e(t)|dt$ (c) $\int_{-\infty}^\infty t\,|e(t)|dt$ (d) $\int_{-\infty}^\infty t\,dt$

6. Use of *I*-control along with *P*-control facilitates   CO3- R

   (a) elimination of offset   (b) reduction of offset

   (c) reduction of stability time   (d) none of these

7. The phenomenon of cavitation is related to _____   CO4- R

   (a) Pascal law   (b) Bernouli's theorem   (c) Newton's law   (d) Hooks law

8. In Electro-Pneumatic Direction control valves the actuation is done   CO4- R
   by which of the following?

   (a) Lever   (b) Push button   (c) Solenoid   (d) Relay

9. The control configuration with primary loop and secondary loop is   CO5- R
   known as _____

   (a) Cascade control   (b) Split range control

   (c) Ratio control   (d) Feed forward control

10. The control configuration with primary loop and secondary loop is   CO5- R
    known as _____.

    (a) Cascade control   (b) Split range control

    (c) Ratio control   (d) Feed forward control

PART – B (5 x 2= 10Marks)

11. A self regulatory system does not require a controller. True/False. Justify the   CO1- U
    answer.

12. Draw the circuit for electronic PI controller.   CO2- U

13. What are the parameters required to design a best controller?   CO3- U

14. Summarize the guidelines for the selection of control valves.   CO4- R

15. Show the advantage of cascade control over conventional control   CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Consider the system shown in fig. Develop a mathematical   CO1- App   (10)
        model for the system. Assume that the effluent stream from a
        tank is proportional to the hydrostatic liquid pressure that causes
        the flow of liquid. Cross-sectional area of tank-1 is A_1 in (ft^2)
        and of tank-2 is A_2 (ft^2). The flow rates F_1, F_2 and F_3 are in
        ft^2/min. Take necessary assumptions.

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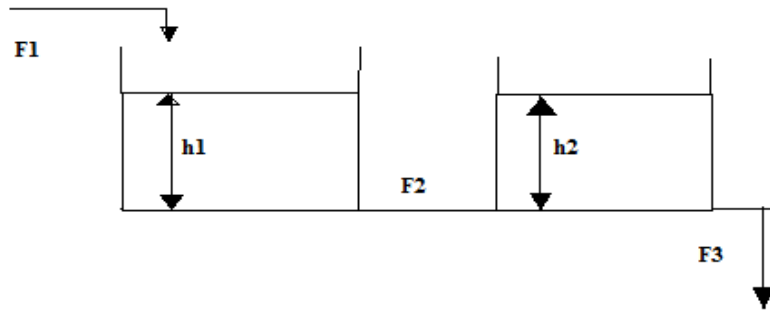
| | | | CO1- App | (6) |

Or

(b) Derive the transfer function for interactive capacities of two tank system   CO1- U   (16)

17. (a) Discuss the electronic PI and PID controller and derive the expression for the Parameter with neat circuit diagram.   CO2- App   (16)

Or

(b) (i) Illustrate the need and benefit of each component of composite PID controller.   CO2- U   (8)

(ii) Draw and explain pneumatic proportional controller.   CO2- U   (8)

18. (a) Describe the operation of pneumatic actuators with and without valve positioner   CO3- U   (16)

Or

(b) Explain process reaction curve method & damped oscillation method   CO3- Ana   (16)

19. (a) What is valve positioner? And explain in detail about Motion balance positioner and Force balance positioner.   CO4- U   (16)

Or

(b) Describe the operation of pneumatic actuators with and without valve positioner.   CO4-U   (16)

20. (a) Discuss any typical application which needs cascade control scheme.   CO5- U   (16)

Or

(b) Illustrate the operation of split range controller and inferential controller.   CO5- U   (16)

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