BT – MRE – VIII – 07.13 – 0785

B.Tech. Degree VIII Semester Examination in Marine Engineering July 2013

MRE 804 MARINE CONTROL ENGINEERING AND AUTOMATION

Time : 3 Hours Maximum Marks : 100

(5 x 20 = 100)

I. (a) Explain the working of a flapper nozzle with the help of a neat diagram and also indicate the importance of photoconductive cells in it. (12)

(b) Explain the temperature measuring devices and its classifications. (8)

OR

II. Explain the following terms with the help of suitable diagrams. (8)

(i) Oil mist detector (6)

(ii) Force balance transducer (6)

(iii) PH meter

III. Explain the working and functions of a mechanical proportional, integral and derivative systems with the help of suitable diagrams. (20)

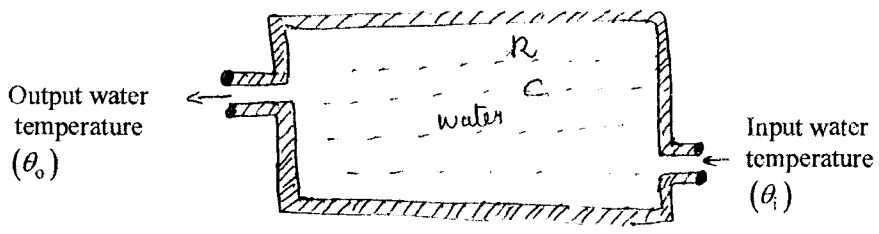
OR

IV. (a) Explain the working of an electronic P-I system. Derive the relation between the input and output. (12)

(b) Give a comparison between desired value and set value. (8)

V. (a) Explain the steady state and transient response with the help of a unit step signal. (10)

(b) A thermal system used for heating the flow of water is given below: An electric heater is provided in the storage tank to heat the flow of water. (10)

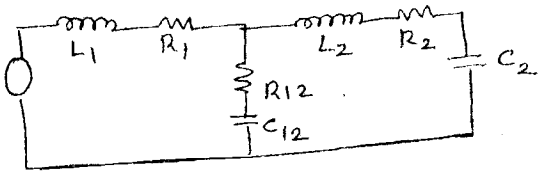


where the inlet water temperature is $\theta_i^\circ c$ and the outlet water temperature is $\theta_o^\circ c$,
'R' is an element which dissipates energy and converts it into heat.
'c' is an energy storage element.

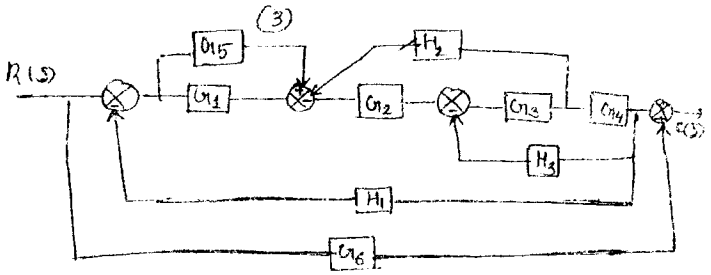
OR

(P.T.O)

VI. (a) Find the T/F of the given system. (8)



(b) Reduce the block given below: (12)



VII. Explain the Nyquist stability criteria. Sketch the Nyquist countour for the given open loop system (20)

$$G(s)=\frac{1}{s(s+1)(s+2)(s+3)}$$

Comment about the stability.

OR

VIII. (a) What is stability? Explain how to find the stability of a system by Routh Hurwitz criteria and Nyquist criteria. Compare each other. (10)

(b) What is critical point? Explain the role of critical point to find the stability. (4)

(c) The openloop T/F of a unity feed back system is given by (6)

$$G(s)=\frac{k}{(s+2)(s+4)(s^2+6s+25)}$$

Find the range of 'k' value if the system is stable.

IX. (a) Sketch and describe a system used for cooling water temperature control of a main machinery unit. (10)

(b) What should be the 'fail safe' arrangement for the above system? Discuss if the control value can be 'No' or 'NC' type. (10)

OR

X. (a) With the help of a block diagram explain the process of starting a direct reversing diesel engine with bridge control. What are the starting interlocks usually provided? (10)

(b) Discuss the instrumentation requirements for a UMS class vessel. (10)

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