BT–MRE–VIII(S)–07.17–1079 Reg. No. | | | | | | | | | |

A

B.Tech. Degree VIII Semester Supplementary Examination in Marine Engineering July 2017

MRE 804 MARINE CONTROL ENGINEERING AND AUTOMATION

(*Prior to 2013 scheme*)

Time: 3 Hours Maximum Marks: 100

(5 × 20 = 100)

I. (a) Explain flapper nozzle mechanism. (6)

(b) Explain different temperature measuring devices. (8)

(c) With neat diagram explain oil mist detector. (6)

OR

II. (a) Explain with a neat sketch force balance transducers. (10)

(b) Explain variable inductance and capacitance transducers. (10)

III. (a) Explain the term process control and terms associated with process control using an example. Also explain the need of automatic control system. (12)

(b) Differentiate open loop and closed loop system with examples. (8)

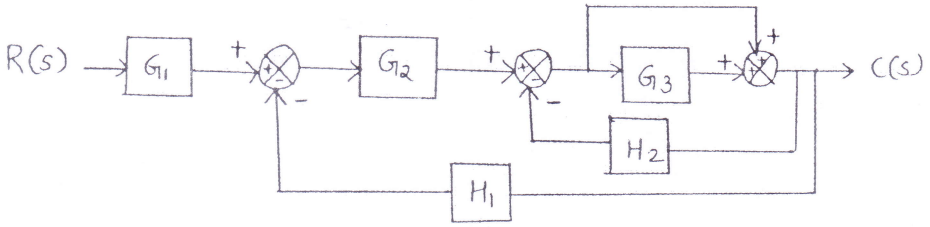
OR

IV. (a) Explain the functions of proportional, integral and derivative controllers using examples. (14)

(b) Explain two step control and cascade control. (6)

V. (a) Explain with a neat sketch electro-pneumatic transducers. (10)

(b) Reduce the block diagram given below and find the transfer function. (10)

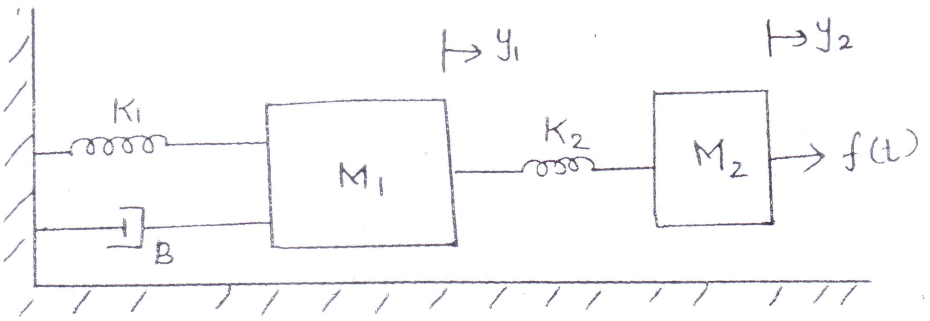


OR

VI. (a) Find the unit step response of a system whose transfer function is given by (10)

$$\frac{C(s)}{R(s)} = \frac{1}{s^2 + 6s + 5}.$$

(b) Determine the transfer function of the following for the mechanical system. (10)



(P.T.O.)

VII. Define Nyquist stability criterion. Sketch a nyquiest contour whose open loop transfer function is given by $G(s)H(s)=\frac{k(1+s)^2}{s^3}$. Find the range of '$k$' for stability. (20)

OR

VIII. (a) A unit feedback system is characterized by open loop transfer function $G(s)=\frac{10}{s(s+2)(s+5)}$. Determine the type of system, error constants and steady state error due to unit step, ramp and parabolic functions. (10)

(b) Construct a Routh array and determine stability of stem whose characteristic equation is given by $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$ and also determine the position of roots lying in s-plane. (10)

IX. (a) With the help of schematic diagram explain the process of starting a direct reversing diesel engine with bridge control. (10)

(b) Sketch and describe the air/fuel ratio control system in marine boilers. (10)

OR

X (a) Sketch and describe temperature control system used for jacket water cooling. (10)

(b) Discuss the instrumentation requirements of UMS class vessels. (10)

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