

B. Tech Degree VIII Semester Examination in Marine Engineering December 2010

MRE 804 MARINE CONTROL ENGINEERING AND AUTOMATION

Time : 3 Hours

Maximum Marks : 100

- I. (a) Explain the different types of flow measuring devices. (12)
 (b) Write a short note on PH sensors. (8)

OR

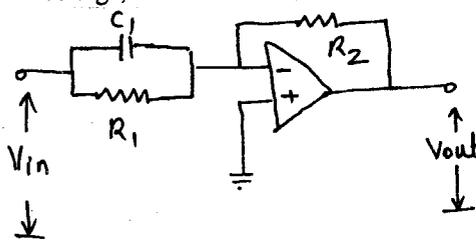
- II. (a) What is photoconductive cell? Describe the importance of photoconductive cells in a Flapper-nozzle device to control the pneumatic pressure in an airline. (12)
 (b) Discuss the importance of an oil mist detector. (8)

- III. Explain any four of the following terms with the help of suitable diagrams :
 (i) Closed loop open loop control system
 (ii) Two step controller
 (iii) Electronic PID
 (iv) Desired value and set value
 (v) Transfer function
 (vi) Automatic Control System (4 x 5 = 20)

OR

- IV. (a) Explain functioning of a proportional controller. (10)
 (b) What is the effect of adding Integral and Derivative function to it? (10)

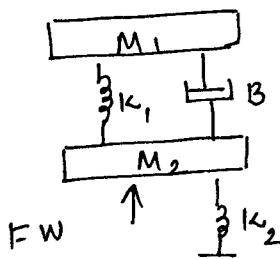
- V. (a) Examine the system performance with respect to time with the help of a step signal. (12)
 (b) Find the transfer function of the given electrical system, where 'Vin' is the input voltage, 'Vout' is the output voltage.



capacitance $C = 10\mu f$
 resistance $R1 = 100K\Omega$
 resistance $R2 = 100K\Omega$ (8)

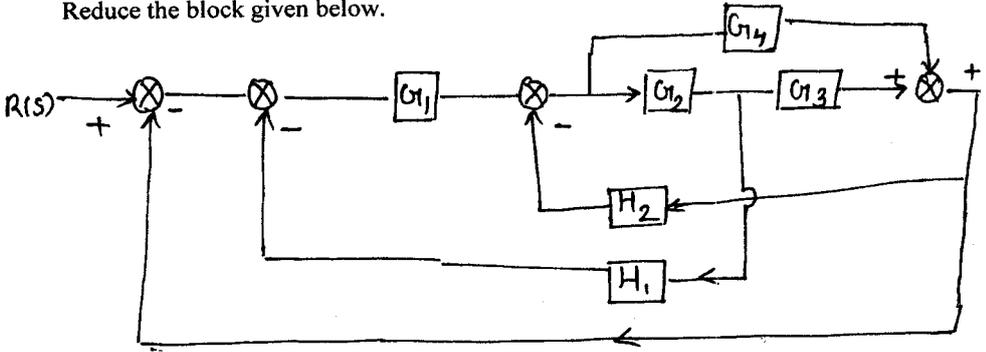
OR

- VI. (a) A one wheeled model of an automobile suspension system with the mass of an automobile $M1$, shock absorbers (B), springs ($K1$), the mass of the wheels ($M2$) and the elastance of the tyres ($K2$) are given below. Let $F_w(t)$ is the disturbance force applied on it. Find the transfer function of the automobile system. (10)

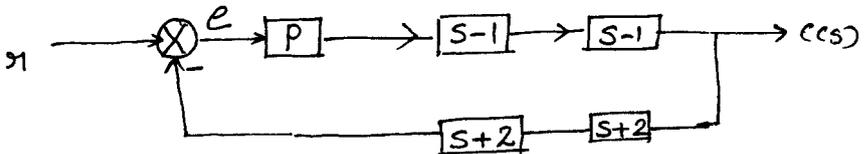


(P.T.O.)

(b) Reduce the block given below.



- VII. Explain Routh's stability criteria. Explain the important role of poles and zeros to find out the stability.
Find the range of 'P' value by using R-H criteria, whether the system is stable.



OR

- VIII. What is critical point? How it plays an important role to define the stability?
Draw the Nyquist plot for the system, whose open loop transfer function is

$$G(s) = \frac{K}{s(s+2)(s+10)}$$

Determine the range of k for which the closed loop system is stable.

- IX. Sketch and describe working of the manoeuvring system of a direct reversing two stroke diesel engine with Bridge control.

OR

- X. Discuss in detail about the instrumentation requirements for a UMS class Vessel's Engine Room. Mention about the importance of each of these items and action to be taken if there is a failure of any of these provisions.