

B.Tech Degree VIII Semester Examination in Marine Engineering June 2012

MRE 804 MARINE CONTROL ENGINEERING AND AUTOMATION

Time: 3 Hours

Maximum Marks: 100

- I. Explain the following terms with the help of suitable diagrams:
- (i) Unbounded strain gauge (7)
 - (ii) Salinity indicators (6)
 - (iii) Oil mist detector (7)

OR

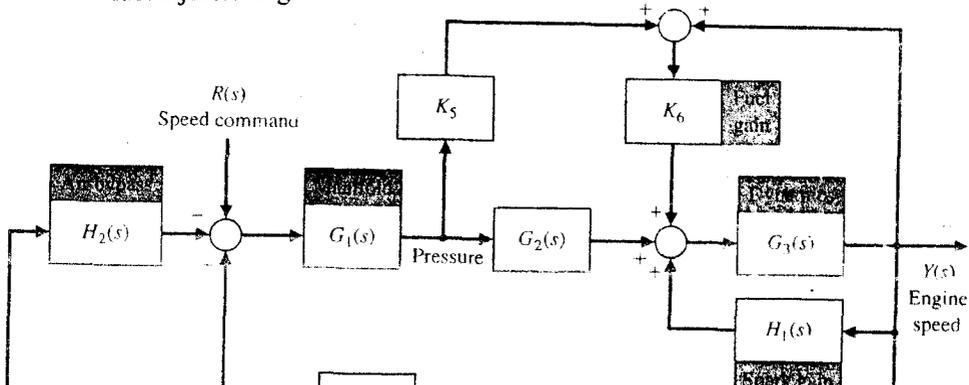
- II. (a) What are the different types of flow measuring devices? Explain. (12)
 (b) Explain the working of a flapper nozzle. (8)

- III. What do you mean by an automatic control system? Explain the role of proportional, differential and integral controllers to make the system to be stable. (20)

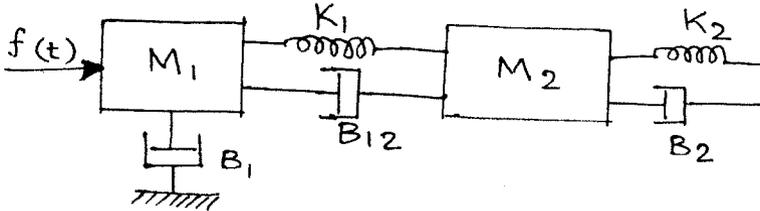
OR

- IV. Explain:
- (i) Open loop and closed loop systems
 - (ii) Electronic PID
 - (iii) ON-OFF controller
 - (iv) Cascade control system (4 × 5 = 20)

- V. (a) Find the transfer function for $Y(S/R(S))$, for the idle speed control system for a fuel injected engine as shown below. (10)



- VI. (a) Explain the system behaviour as a result of different input with respect to time or frequency. (7)
- (b) Let $f(t)$ be the applied force to the mechanical system. Draw the corresponding electrical analogous system. (13)

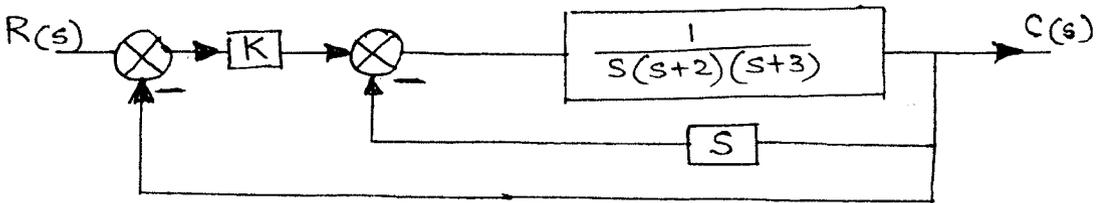


- VII. (a) 'Nyquist is the most accurate method to find the stability'. Explain. (6)
- (b) Sketch the Nyquist contour for the given open loop system

$$G(S) = \frac{K}{S(S+1)(1+2S)} \quad (14)$$

OR

- VIII. (a) A block diagram is shown below.



- (i) Find the closed loop transfer function.
- (ii) Find the range of 'K' for stability.
- (iii) If the system is oscillates, then find the frequency of oscillation. (15)
- (b) Explain the concept of stability with the help of an example. (5)
- IX. Explain the automatic functioning of M/E manoeuvring system for a 2 stroke reversible diesel engine with Bridge control. (20)

OR

- X (a) Explain the difference between "3 Term" and "3 Element" controller with