

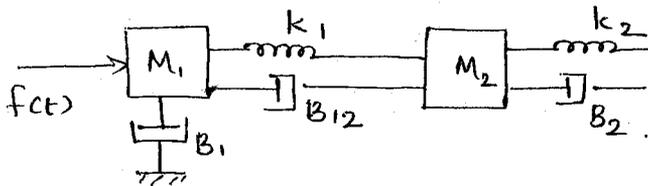
## B. Tech Degree VIII Semester Examination in Marine Engineering June 2011

### MRE 804 MARINE CONTROL ENGINEERING AND AUTOMATION

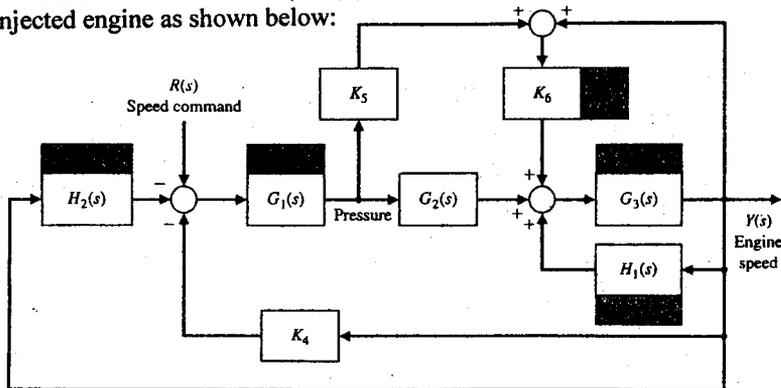
Time : 3 Hours

Maximum Marks : 100

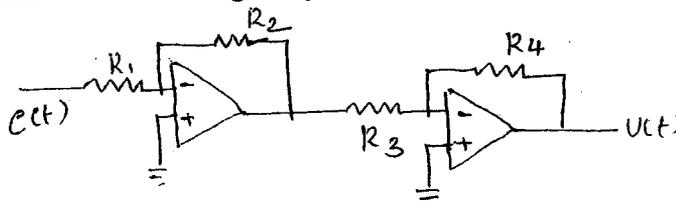
- I. (a) Explain the working of a flapper nozzle. (8)  
 (b) Explain the flow measuring devices and its classifications. (12)
- OR**
- II. Explain the following terms with the help of suitable diagrams (7)  
 (i) Unbounded strain gauge (7)  
 (ii) Salinity Indicators (6)  
 (iii) Oil mist detector (7)
- III. How the proportional, differential and integral controllers make an important role in an automatic control system? (20)
- OR**
- IV. Explain (i) Electronic PID (4x5=20)  
 (ii) Open loop and closed loop systems  
 (iii) ON-OFF controller  
 (iv) Transfer function
- V. (a) Explain the steady state and transient response, with the help of a unit step signal (7)  
 (b) Let  $f(t)$  is the applied force to the mechanical system. Draw the corresponding Electrical analogous system. (13)



- VI. (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)



- (b) Find the transfer function of the given system (10)



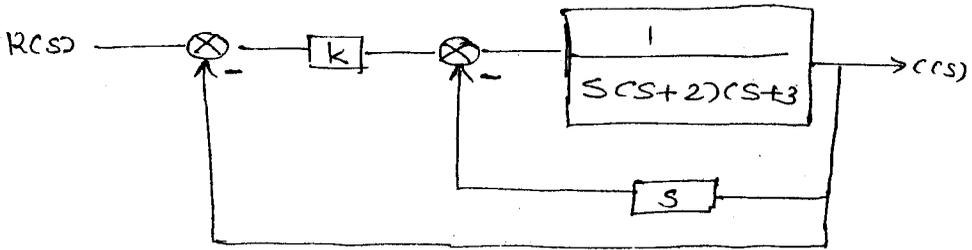
(P.T.O)

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

$$G(S) = \frac{(1+4S)}{S^2(1+S)(1+2S)}$$

OR

- VIII. (a) A block diagram is shown below: (15)



- (i) Find the closed loop transfer function  
(ii) Find the Range of 'K' for stability  
(iii) If the system oscillates, then find the frequency of oscillation
- (b) Explain the Routh Hurwitz stability Criteria, with the help of an example. (5)
- 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 Valve can be 'NO' or 'NC' Type. (10)
- OR
- X. (a) With the help of a block diagram explain the process of starting of 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)