B

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

### MRE 1806 (C) FLUID CIRCUITS AND CONTROL
(2013 scheme)

Time: 3 Hours   Maximum Marks: 100

$(5 \times 20 = 100)$

I.   (a)   Explain different types of pressure control valves with diagram, symbol and   (15)
          working for each.
     (b)   List the electrical control elements used in fluid circuits and their symbol.   (5)

OR

II. (a)   Explain the working of check valve and shuttle valve with diagram and   (10)
          symbol.
     (b)   Explain the following: $(5 + 5 = 10)$
                    (i)   Actuators   (ii)   Flexible hose.

III. (a)   Explain hydraulic reservoirs.   (8)
     (b)   Derive the transfer function for hydraulic system.   (12)

OR

IV. (a)   Explain the properties of air for pneumatic control.   (8)
     (b)   What is fluid power? Discuss its advantages and disadvantages.   (6)
     (c)   Compare hydraulic system and pneumatic system.   (6)

V.   Explain different types of positive displacement pumps with diagrams.   (20)

OR

VI. (a)   Explain different types of compressors with diagrams.   (15)
     (b)   Define accumulator and explain one application of accumulator.   (5)
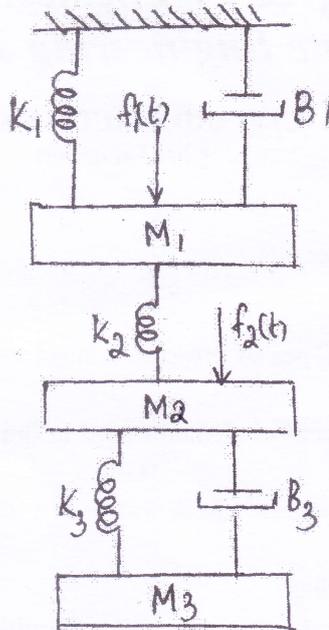
VII. (a)   Reduce the block diagram.   (12)
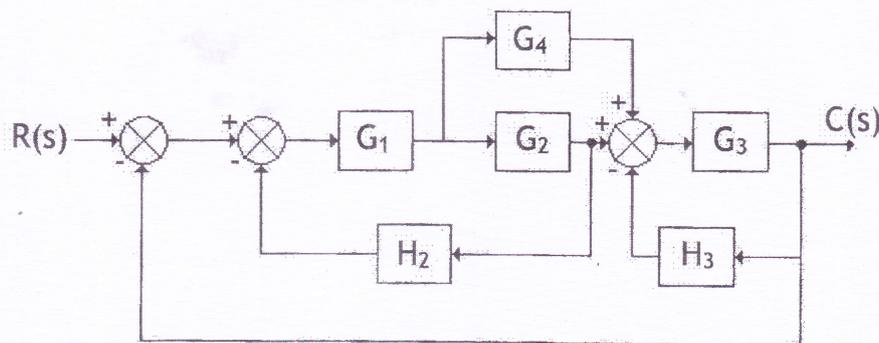
     (b)   Compare open loop and closed loop system with example.   (8)

OR

(P.T.O.)

VIII. (a) Find the electrical analogous circuit for the mechanical system and find the transfer function. Draw the circuit using current source and show the F-I relations. (12)

(b) Derive the transfer function of thermal system. (8)

IX. (a) The open loop transfer function of a unity feedback system is $\dfrac{K(s+1)}{(s^3 + as^2 + 2s + 1)}$. Determine the value of K and a so that the system oscillates at a frequency of 2 rad/sec. (10)

(b) Explain the following: (10)
       (i) Fluid coupling   (ii) Hydraulic lift.

OR

X   Sketch the root locus for the unity feedback system with open loop transfer function $\dfrac{K}{s(s+4)(s^2 + 4s + 20)}$. (20)

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