BT-MRE-VIII(S)-06.24-3277 Reg. No. | | | | | | | | |

C

B.Tech. Degree VIII Semester Supplementary Examination in Marine Engineering June 2024

MRE 1806 (C) FLUID CIRCUITS AND CONTROL (ELECTIVE)

(*2013 Scheme*)

Time: 3 Hours Maximum Marks: 100

Answer *ALL* questions (5 × 20 = 100)

I. (a) How does pilot operated check valve differ from normal check valves? Explain with neat diagrams. (14)

(b) Explain any two electrical control elements used in fluid circuits. (6)

OR

II. (a) Explain the working of Shuttle valve, Needle valve and Solenoid valve with neat diagrams and symbol. (15)

(b) Explain the importance of flexible hoses as a system component. (5)

III. (a) Draw and explain the typical circuit of a pump set. (6)

(b) Define any two control systems and derive the transfer function for each with neat diagrams. (14)

OR

IV. (a) Define thermal system with equation. (4)

(b) Derive the transfer function of Pneumatic system with necessary equations. (10)

(c) Explain any two applications of fluid power. (6)

V. (a) Explain different types of compressors with neat diagrams and symbol. (15)

(b) What is an accumulator in fluid power system? How does it work? (5)

OR

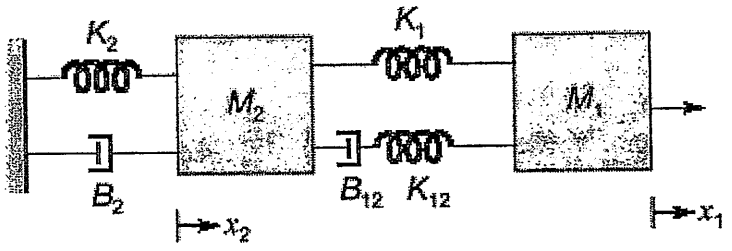
VI. (a) Distinguish between positive and non-positive displacement pumps. (5)

(b) Explain the working of the following with diagram. (15)

(i) Reciprocating pump
(ii) Piston pump
(iii) Screw pump.

(P.T.O.)

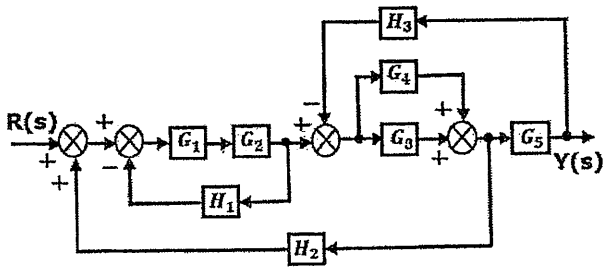
VII. Draw the Force Voltage and Force Current analogous circuits for the given mechanical translational system. Also write the differential equations governing the system. (20)



OR

VIII. (a) Explain the importance of Laplace transform in control systems. (5)

(b) Reduce the block diagram and find the Transfer function. (15)



IX. The open loop transfer function of a unity negative feed back system is given by (20)

$$\frac{k(s+1)(s+2)}{s(s+3)}$$

Draw the root locus as the value of k varies from zero to infinity.

OR

X. Consider a system with an open loop transfer function (20)

$$\frac{K(s+2)}{s(s+5)(s^2+2s+5)K(s+2)}$$

Using Routh Hurwitz criteria, determine the range of values of K for which the system is stable.

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