

**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**B.TECH. DEGREE VIII SEMESTER EXAMINATION IN MARINE ENGINEERING  
JULY 2020**

**MRE 1806(C) FLUID CIRCUITS AND CONTROL**  
(2013 Scheme)

Time: 36 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet]  
Max. Marks: 20

**INSTRUCTIONS**

1. You have to be available in Google Meet on demand by the faculty.
2. You have to share your '**live location**' to the faculty before uploading the answer sheet.
3. You have to answer only one question.
4. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
5. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
6. You have to put dated signature along with Register Number, Subject Code, Module/Group Number (as given in the Question Paper) in each page.
7. You have to put the Question Number correctly.
8. After answering the question, you have to scan and upload the answer page.

**MODULE - I**

(Answer **ANY ONE** question)

I(1). Explain the working of Pressure Relief valve and Pressure Reducing valve with diagram and symbol for each. (20)

**OR**

I(2). How can you use an orifice as a flow control device? Explain the working of needle valve with diagram and symbol. (20)

**MODULE - II**

(Answer *ANY ONE* question)

- II(1). (a) Compare hydraulic and pneumatic system. (10)  
 (b) Derive the transfer function of a Liquid level system with diagram. (10)

**OR**

- II(2). (a) List the properties of air for pneumatic control. (10)  
 (b) Explain the working of a Hydraulic reservoir with a neat sketch. (10)

**MODULE - III**

(Answer *ANY ONE* question)

- III(1). What is a compressor? Explain any two types of compressors and its working with diagrams. (20)

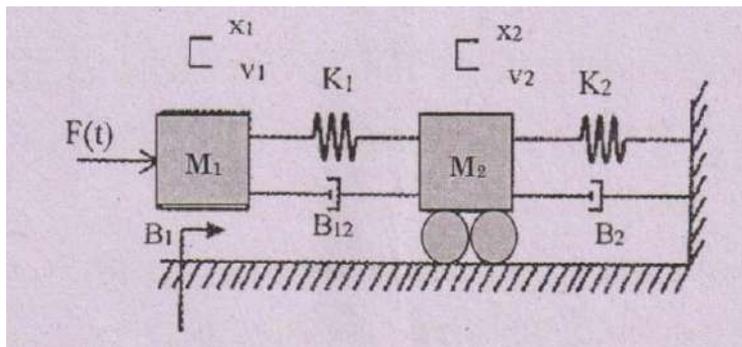
**OR**

- III(2). Explain any two types of positive displacement pumps with its working and diagrams. (20)

**MODULE - IV**

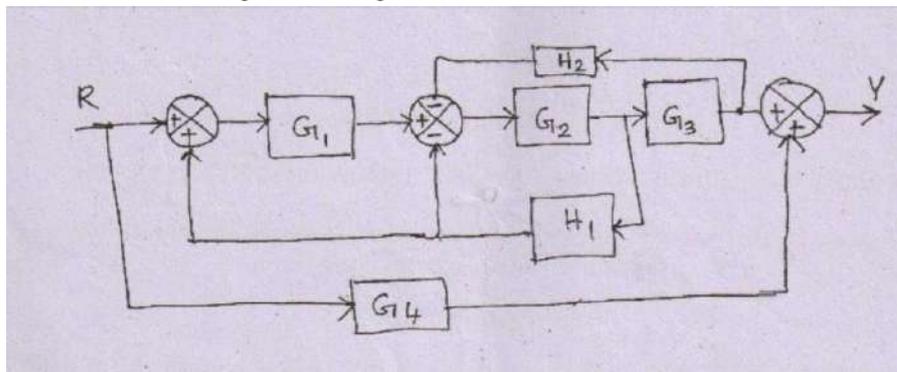
(Answer *ANY ONE* question)

- IV(1). Find the Force Voltage electrical analogous circuit for the mechanical system given below with all the steps for the same. (20)



**OR**

- IV(2). Reduce the following Block diagram. (20)



**MODULE - V**  
(Answer *ANY ONE* question)

V(1). The open loop transfer function of a unity feedback control system is given by (20)

$$\frac{k(s+2)}{s(s-2)(s^2+5s+16)}$$

Using Routh Hurwitz criteria, find the stability of the closed loop system as a function of K. Find the value of K for sustained oscillations and the corresponding oscillating frequencies.

**OR**

V(2). Analyse the given system using the steps for the Root locus method and find the limiting value of K and the corresponding frequencies for the unity feedback system with open loop transfer function given by, (20)

$$G(s) = \frac{k}{s(s^2+8s+32)}$$

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