
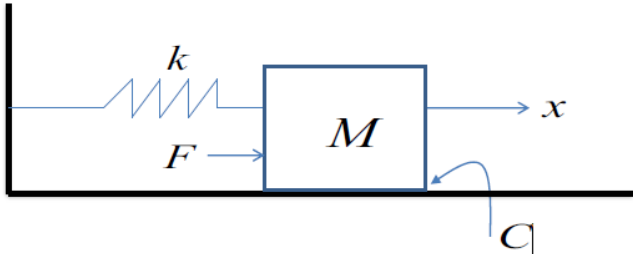
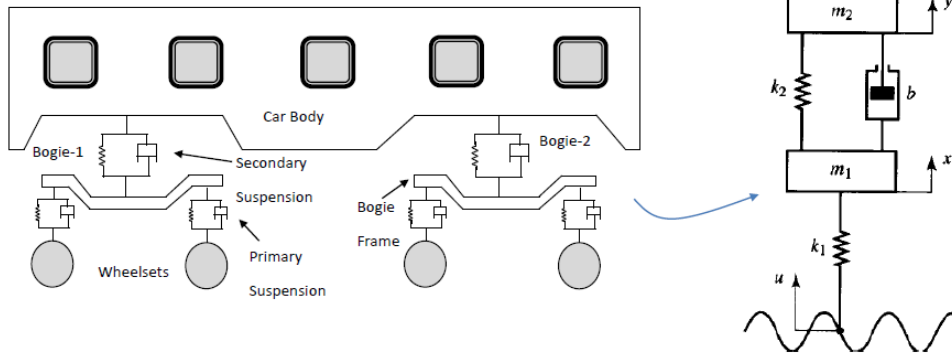


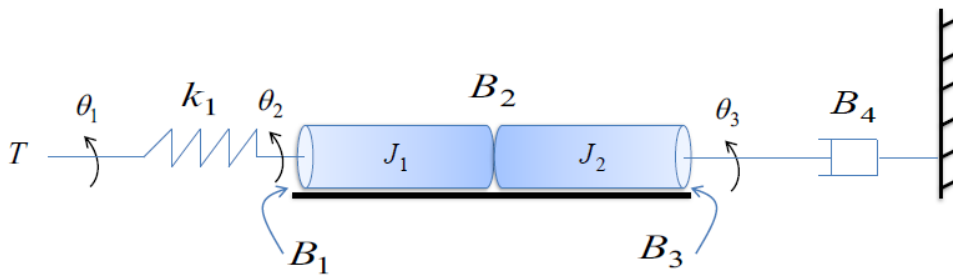
Name:			
Enrolment No:			
UPES End Semester Examination, December 2024			
Course: Instrumentation and Control Program: B.Tech. – Mechanical Engg Course Code: ECEG4036		Semester: VII Time : 03 hrs. Max. Marks: 100	
Instructions: All questions are to be answered			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Justify the need and advantages of Calibration of any measuring device	4	CO1
Q 2	Enumerate the four types of Standards used in Measuring Instruments	4	CO1
Q 3	A piezoelectric crystal having dimensions of 5mm x 5mm x 1.5mm and a voltage sensitivity of 0.055 V-m/N is used for force measurement. Calculate the force if the voltage developed is 100V.	4	CO2
Q 4	A linear resistance potentiometer is 50 mm long and is uniformly wound with a wire of total resistance 5000 Ω . Under normal conditions, the slider is at the center of the potentiometer. Determine the linear displacement when the resistance of the potentiometer is 1850 Ω .	4	CO1
Q 5	Describe the working of the Ph meter.	4	CO2
SECTION B (4Qx10M= 40 Marks)			
Q 6	Analyze and evaluate the advantages/disadvantages of Magnetic Flow meter and Ultrasonic Flow meter.	10	CO3
Q 7	Find the transfer function of the following System.	10	CO5
			

<p>Q 8</p>	<p>The ratio arms of the Wheatstone bridge shown in Fig. below are $R_1 = 1000 \Omega$, $R_2 = 100 \Omega$. The standard resistance $R_3 = 400 \Omega$. The unknown resistance $R_X = 41 \Omega$. A 1.5 V battery with negligible internal resistance is connected from the junction of R_1 and R_2 to the junction of R_3 and R_X. The galvanometer with an internal resistance of 50Ω and a current sensitivity of $2 \text{ mm}/\mu\text{A}$ is connected to the other corner of the bridge (Fig). Calculate the deflection of the galvanometer caused by the imbalance in the circuit.</p>	<p>10</p>	<p>CO3</p>
<p>Q 9</p>	<p>Reduce the block diagram shown in Fig. 1 to a single block using the block diagram technique</p> <p style="text-align: center;"> </p> <p style="text-align: center;">Fig.1</p> <p style="text-align: center;">OR</p> <p>A platinum resistance thermometer has a resistance of 120Ω at 25°C. Determine its resistance at 75°C. The temperature coefficient of resistance is 0.00392 at 25°C. If the resistance is 180Ω, what is temperature T_3?</p>	<p>10</p>	<p>CO4</p>
<p>SECTION-C (2Qx20M=40 Marks)</p>			
<p>Q 10</p>	<p>Develop a mathematical model for below mentioned Train suspension system.</p>	<p>20</p>	<p>CO5</p>

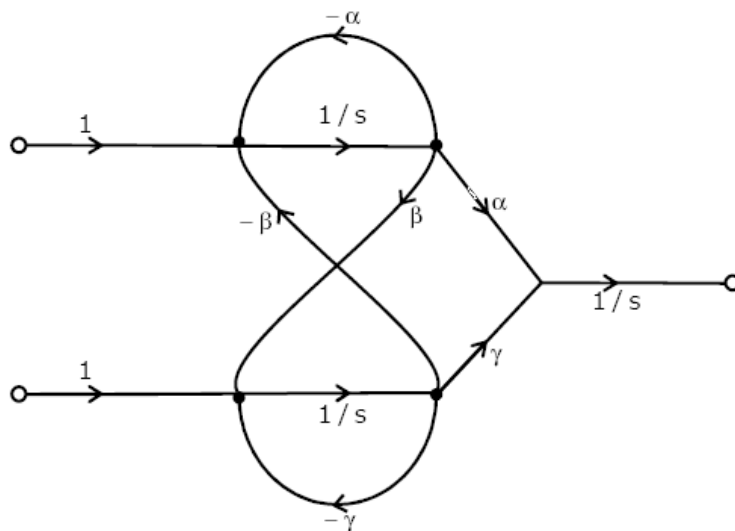


OR

Make a mathematical model and equivalent schematic for the below mentioned Mechanical arrangements:



Q 11 SFG for 2 input single output system is given below to find the overall transfer function. Assume $x_1(s)$, and $x_2(s)$ are two input and $Y(s)$ as an output signal.



20

CO4