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**GIET UNIVERSITY, GUNUPUR - 765022**  
M. Tech. (Third Semester) Examinations, December - 2023  
**MPEMD3022 - Mechatronics**  
(Machine Design)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

**PART – A****(2 x 10 = 20 Marks)**

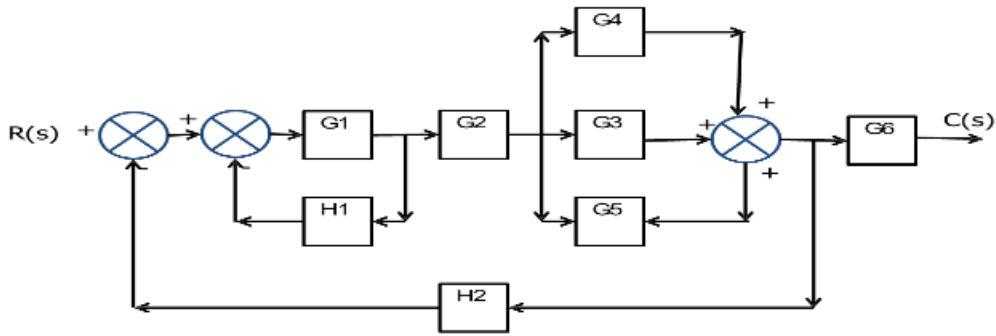
Q1. Answer ALL questions

	CO#	Blooms Level
a. Enlist any four applications of mechatronic system in Automobile.	CO3	K1
b. Define is stimulus with some examples.	CO3	K1
c. Explain the requirement of position sensor.	CO3	K1
d. Define LVDT?	CO2	K2
e. What is the basics of PLC ?	CO1	K2
f. Why do we need data acquisition system?	CO2	K1
g. State Nequist sampling theorem.	CO3	K2
h. Obtain the basic function of control system?	CO1	K1
i. Mention the advantages of integral control?	CO4	K2
j. What are counters? State their uses.	CO4	K1

**PART – B****(10 x 5 = 50 Marks)**Answer ANY FIVE questions

	Marks	CO#	Blooms Level
2. a. Differentiate between sensors, transducer and actuators	3	CO3	K1
b. Give some examples of temperature sensors? Explain in details about the working of thermocouple with neat sketch.	7	CO3	K2
3.a. Give some examples of force sensors? Explain in details about the working of strain gauge with neat sketch.	6	CO1	K2
b. Differentiate between stepper motor and servo motor.	4	CO3	K1
4. a. Distinguish between synchronous and asynchronous data transmission.	5	CO2	K1
b. Draw the signal flow path for DAS. List out the elements of DAS.	5	CO1	K2
5. Develop ladder logic for a bottle filling station having following sequence.	10	CO1	K3
i. When START button is pushed, the conveyor motor (Q1) starts.			
ii. When bottle reaches filling station, Proximity (P1) is ON, the conveyor (Q1) stops.			
iii. The solenoid valve is ON			
iv. When bottle is filled proximity 2(P2) is ON, and solenoid valve is OFF.			
v. When proximity 2 (P2) is ON, the conveyor motor (Q1) starts			
vi. When end station is reached proximity 3 (P3) is ON and conveyor motor (Q1) stops			
Go to step 1 for the bottle			
6. a. Distinguish between synchronous and asynchronous data transmission.	5	CO2	K1

- b. Draw the signal flow path for DAS. List out the elements of DAS. 5 CO2 K2
- 7.a. Find the transfer function of following control system as shown in figure using block diagram reduction principles. 10 CO4 K3



8. Sketch the basic architecture of a PLC and explain the function of each element. 10 CO4 K2

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