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BHARATIYA VIDYA BHAVAN'S
SARDAR PATEL COLLEGE OF ENGINEERING
(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai - 400058.



End Semester Exam
November 2016

Class: T Y. BTech. (Mechanical)
Program: B. Tech. (Mechanical Engineering)
Course Code: BTM 503
Maximum Marks: 100

Semester: VI
Name of the Course: Mechatronics

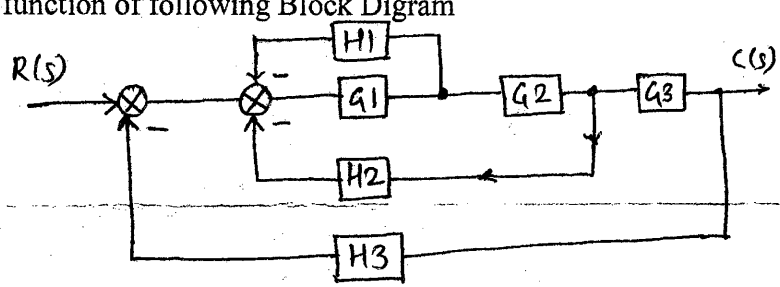
Duration: 3 Hrs

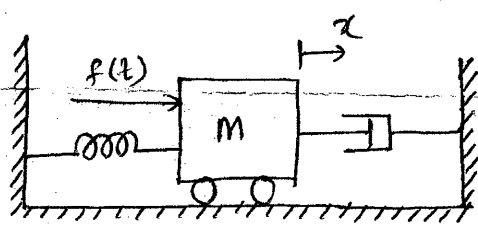
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Instructions:

1. Attempt any five questions out of Seven
2. Draw neat diagrams
3. Assume suitable data if necessary
4. Figures to the right are Marks , Module & COs

			Marks	Mod	CO
Q.1	a	Explain the concept of Mechatronics with suitable examples & Basic components of Mechatronics System	10	I	1
	b	Explain Microprocessor & Microcontroller with Functional Block diagram & Architecture	10	II	1
Q.2	a	Explain the SFRs & Memory mapping in detail of 8051	10	II	1
	b	Develop Cascade Pneumatic Circuit A+ B+ B- A-	10	III	2
Q.3	a	Write PLC Programming for AND, OR ,NOT,XIC,XIO	10	III	2
	b	Develop Pneumatic Semi automatic material handling system & Explain working of Pressure sequencing valve with cut section	10	III	2
Q.4	a	Write a Block diagram Reduction rule & Obtain Transfer function of following Block Diagram	10	IV	3



Q.4	b	Explain the Stability Criteria with suitable example	10	IV	3
Q.5	a	Predict the Root Locus for the system having $G(s)H(s) = \frac{k}{S(S^2 + 2S + 2)}$	10	VI	3
	b	Explain the Magnitude Plot & Phase angle plot of Bode Plot for various factors.	10	VI	3
Q.6	a	For unity feedback control system has $G(s) = \frac{80}{S(S + 2)(S + 20)}$ Draw Bode Plot Determine, a) Gain crossover frequency b) Phase crossover frequency c) Gain margin d) Phase margin . Comment on Stability of the system	10	IV	4
	b	Derive the Effect of Standard inputs on Steady state error.	10	V	4
Q.7	a	Obtain the state model for the mechanical system given in fig. 	10	VII	4
	b	Obtain the transfer function for a system having state model $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & -3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 3 \\ 5 \end{bmatrix} u$ $y = \begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}, D=0$	10	VII	4