Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

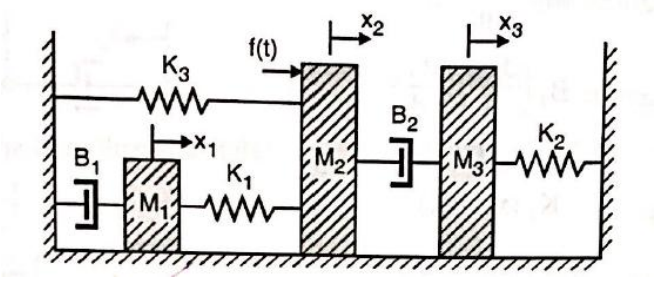
EXM/P/09/00

Year and Program: B.Tech	School of Technology	Department: Mechanical
Course Code: MET405	Course Title: Automatic Control Systems	Semester :VII
Day : Thursday Date: 24.12.2020	End Semester Examination	Time:2 Hrs. Max Marks:50

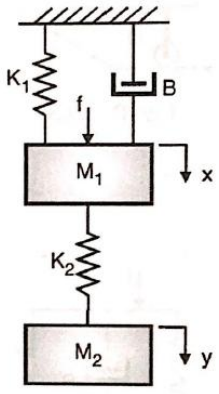
Question Paper

Instructions: 1) All Questions are compulsory.
2)Use Non-Programmable Calculator

Q.1	**Answer the following (any Two)–**	**Marks**	**Bloom's Level**	**CO**
a)	Obtain the mathematical model of following mechanical system.	8	L2	405.1



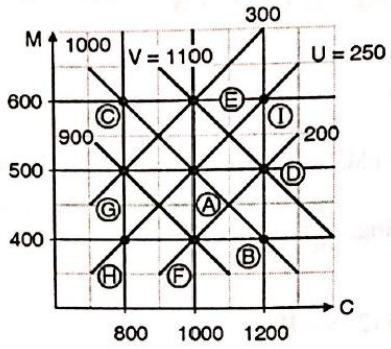
b)	For the mechanical system shown in fig. , Construct grounded chair representation and find the equations those relate f to x and x to y	8	L2	405.1



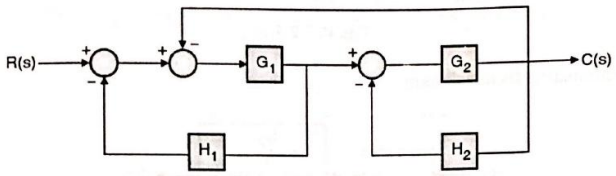
c)	Apply Routh's criterion, to determine the number of roots that lie in right half plane of the following characteristic equation. Comment on system stability. $S^4+6S^3+10S^2+12S+16=0$	8	L1	405.3

Q.2 **Answer the following (any two) –**

a) The steady state operating curves for a unity feedback system are shown in figure. Construct the block that describes the steady state operation of the system. 8 L2 405.2



b) Simplify the block diagram shown below and obtain the transfer function. 8 L3 405.2



c) Define (with figure) 8 L1 405.3
(i)zeros of system
(ii)poles of system
(iii)S plane

Q.3 **Answer the following (any two) –**

a) Explain components of PLC with neat diagram. 9 L1 405.4

b) Explain the concept of Internet of things (IoT) with suitable examples. 9 L2 405.4

c) Draw the root locus for the unity feedback system whose open loop transfer function is 9 L3 405.3
$G(s)=\frac{K(s+1)}{(s-1)(S+2)(s+4)}$
Find the range of K for which the system is stable.

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