



## End Semester Examination – Nov/Dec – 2016

Code : 14ME2042  
Sub. Name : Mechatronics and Control systems

Semester : 2016-17 ODD  
Duration : 3hrs  
Max. marks : 100

### ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	Write the differential equations governing the mechanical system shown below and determine the transfer function.	CO1	(15)
	b.	What is control system? Explain open loop and closed loop control system with an example.	CO1	(5)
(OR)				
2.	a.	Write the differential equation governing the electrical system and derive its transfer function.	CO1	(15)
	b.	Explain the working of the basic mechatronic system.	CO1	(5)
3.	a.	Write the differential equations governing the mechanical rotational system shown below.	CO1	(15)
	b.	Explain current-voltage relation of R,L and C.	CO1	(5)
(OR)				
4.	a.	Find the overall gain $C(s)/R(s)$ for the signal flow graph shown below.	CO1	(15)

	b.	What are the basic properties of signal flow graph?	CO1	(5)
5.	a.	Find the transfer function of the block diagram using block diagram reduction techniques.	CO1	(15)
	b.	Write any five rules for reducing block diagrams.	CO1	(5)
(OR)				
6.	a.	Construct Routh array and determine the stability of the system represented by the characteristic equations $s^5 + s^4 + 2s^3 + 2s^2 + 3s + 5 = 0$ . Comment on the location of the roots of characteristic equation.	CO1	(15)
	b.	What is the necessary condition for stability? Explain the relation between stability and coefficient of characteristic Polynomial.	CO1	(5)
7.	a.	With a neat sketch, Explain the working of Hydraulic Actuating system.	CO2	(15)
	b.	Explain the working of permanent magnet stepper motor.	CO3	(5)
(OR)				
8.	a.	Describe the working of Data Loggers with necessary block diagram.	CO4	(15)
	b.	What are the requirement of selecting the DAQ .	CO4	(5)
<b>Compulsory:</b>				
9.	a.	Explain the architecture of 8051 Microcontroller with neat diagram.	CO5	(15)
	b.	Describe the importance of Programmable logic Controller	CO5	(5)

ALL THE BEST