Reg.No. _____

Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 14EI3017
Sub. Name : DESIGN OF LINEAR MULTIVARIABLE CONTROL SYSTEM

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.	Discuss and Derive the equation for the system to be observability.	CO 1	**10**
	b.	Explain in detail about the system representations using detailed block diagram.	CO 1	**10**
		(OR)		
2.	a.	The characteristic equation is $P(z) = z^3 - 1.3z^2 - 0.08z + 0.24 = 0$ Check the stability of the system using Jury Conditions.	CO 1	**10**
	b.	With an example, Derive the equation for converting state space to transfer function.	CO 1	**10**
3.	a.	Write the conditions for the Linear system.	CO 1	**6**
	b.	Write the performance criteria for LQG Control design	CO 3	**7**
	c.	Write the Routh stability conditions for the system to be stable with an example.	CO 1	**7**
		(OR)		
4.	a.	Explain the concept in designing of Kalman filter with derivation.	CO 3	**10**
	b.	Discuss in detail about the determination of poles and zeros using minimal realization.	CO 1	**10**
5.	a.	Discuss in detail about the robust design stability analysis.	CO 2	**10**
	b.	Derive the Ricatti equation for linear quadratic regulator.	CO 1	**10**
		(OR)		
6.	a.	Explain the design concepts involved in H-infinity robust controller.	CO 2	**10**
	b.	Write short note on sensitivity functions.	CO 1	**5**
	c.	Write the problems in robust control design.	CO 2	**5**
7.	a.	What is the need of Model reduction methods and write the procedure for model reduction.	CO 1	**10**
	b.	Obtain the reduced model for the following function $\frac{1}{(S+0.1)(S+1)(S+10)}$ Use Residualisation and Truncation method for reducing model.	CO 1	**10**
		(OR)		
8.	a.	Write short note on impact of interaction between the variables of Distillation column.	CO 2	**15**
	b.	Give the key issues in Modelling.	CO 1	**5**
		Compulsory:	CO 1	
9.	a.	Derive the mathematical model of paper machine head box and validate the same.	CO 3	**20**

ALL THE BEST

Course Outcome:

CO1: Apply the concept of Multivariable control systems.
CO2: Design controller for multivariable control systems.
CO3: Use the corresponding controller synthesis techniques.