Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

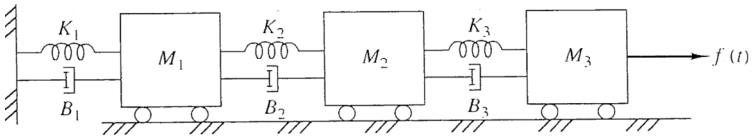
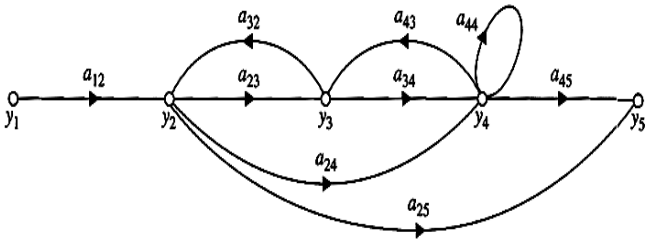
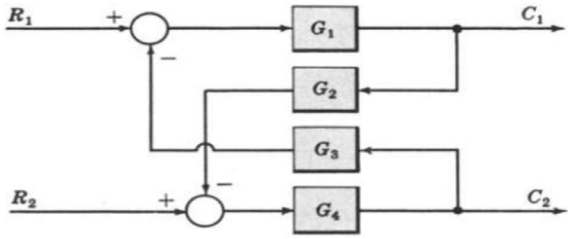
(A constituent unit of MAHE, Manipal)

FIFTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION
FEBRUARY 2022
SUBJECT: LINEAR CONTROL THEORY (ECE - 3152)

TIME: 75 Minutes **MAX. MARKS: 20**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

Q. No.	Questions	
1A.	Write free body diagrams and the governing equations for the system shown. 	4
1B.	Using the signal flow graph given, find the ratio Y_5/Y_2. 	3
1C.	Evaluate outputs. 	3
2A.	The OLTF of a system is given by G(S)H(S) = $\frac{KS^2}{(1+0.2S)(1+0.02S)}$ Sketch the Bode plot of the given system indicating gain and phase margin. Determine K such that gain crossover frequency is 5 rad/sec	4
2B.	Draw the Nyquist plot for the open loop transfer function $\frac{80}{s^2+9s+18}$	4
2C.	A system with $G_P(S)=\frac{5}{(S+1)(S+5)}$ is cascaded with a PD controller. Determine the value of K_C & K_D so that damping ratio is 0.8 and settling time t_s=1 sec in response to a unit step input.	2