Exam. Code: 0943
Sub. Code: 7065

1079

B. Engg. (Mechanical Engg.)

7th Semester

MEC-702: Automatic Controls

Time allowed: 3 Hours | Max. Marks: 50

NOTE: *Attempt **five** questions in all, including Q. No. 1 (Part-A) which is compulsory and selecting atleast two questions each from Part-B & C. Calculator is allowed.*

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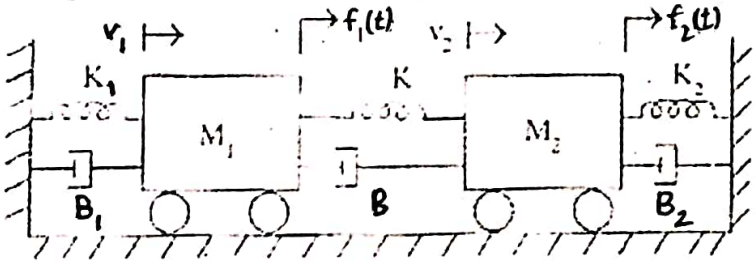
Part A

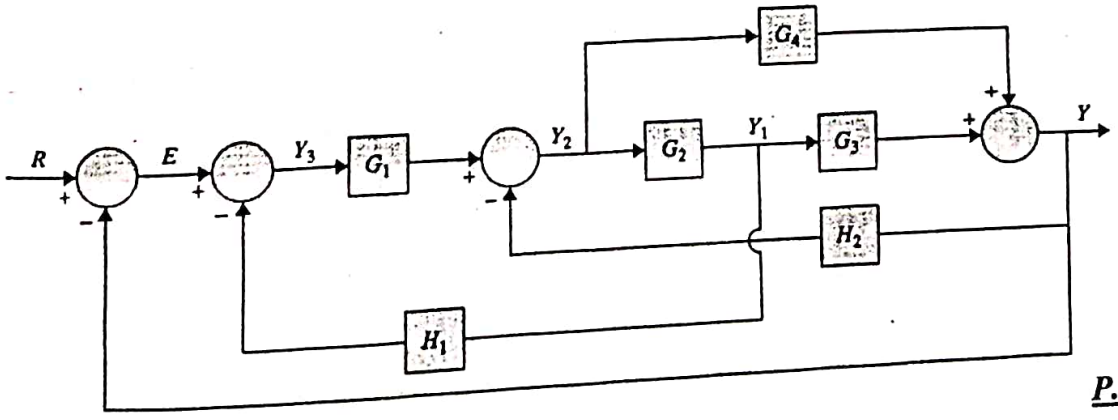
1	a	Why derivate action cannot be used alone.	2
	b	Explain in brief ON-OFF control action.	2
	c	Write the Laplace transform for following input signal i. Step ii. Ramp iii. Parabolic iv. Impulse	2
	d	Define: i. Stability ii. Relative stability	2
	e	Differentiate between Regulators and servo mechanism	2

Part B

2	a	Draw the block diagram of hydraulic Servo System. Explain function of each block.	5
	b	Draw block diagram for automobile driving system. Explain function of each block.	5
3	a	Write the differential equations governing the mechanical system shown in figure. Also draw the force-voltage and force-current analogous circuit.	5



	b	Derive the transfer function of the block diagram by block reduction or signal flow graph.	5



P.T.O.

4 a Compare PI, PD and PID controller. 5

b Explain the working of a temperature control system (Thermal control system). 5

Part-C

5. System is given by differential equation $d^2y/dx^2+4(dy/dx)+8y=8x$. Where y is output and x is input. Determine time domain specification. i) Rise Time, ii) Peak Time, iii) Settling Time, iv) Peak overshoot. 10

6. Consider the system with characteristic equation $\ddot{x} - (k+2)\dot{x} + (2k+5)x = 0$.
a) Determine the value of k for which system is (i) stable, (ii) limitedly stable, (iii) unstable. 10
b) Stable case for what values of k is the system (i) Under damped, (ii) Over Damped.

7. a Define: a)Poles, b) Zeros, c)Order of system, d) Characteristic equation 5

b For the system with transfer function $Y(S)/U(S)=s^2+2s+1/(S^3+7S^2+14s+8)$, write the state-space equations, using partial fraction methods 5

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