Reg. No.												

Question Paper Code	11679

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Third Semester

Mechanical and Automation Engineering

20EIPC304 - BASIC ELECTRONICS AND CONTROL SYSTEM

(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	Draw the symbol of PN Junction and Zener Diode.	*2,K1,CO1*
2.	Among CB, CE and CC Configurations, which one is popular? Why?	*2,K2,CO1*
3.	Draw the non-inverting amplifier.	*2,K1,CO2*
4.	Define – CMRR.	*2,K1,CO2*
5.	What is the function of Sample & Hold Circuit?	*2,K1,CO3*
6.	What are standard analog signal?	*2,K1,CO3*
7.	What are the components of control system?	*2,K1,CO4*
8.	What is a signal flow graph?	*2,K1,CO4*
9.	Define - Pole and Zero.	*2,K1,CO5*
10.	What do you mean steady state error?	*2,K1,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	(i) How a PN junction diode is working? Draw and explain the V-I characteristics of PN junction diode with neat diagram.	*8,K2,CO1*
		(ii) Discuss about drift and diffusion currents of PN Junction diode.	*5,K2,CO1*
		OR	
	b)	(i) Explain the drain and transfer characteristics of Enhancement type MOSFET.	*8,K2,CO1*
		(ii) Draw the working of Silicon Controlled rectifier with neat diagram.	*5,K2,CO1*
12.	a)	Draw the circuit diagram of Emitter Coupled BJT differential amplifier and derive expressions for differential gain, common mode gain, CMRR, input and output impedance.	*13,K2,CO2*
		OR	
	b)	Explain with neat circuit diagram, the working of Hartley Oscillator using Transistors. Derive an expression for frequency of oscillation.	*13,K2,CO2*

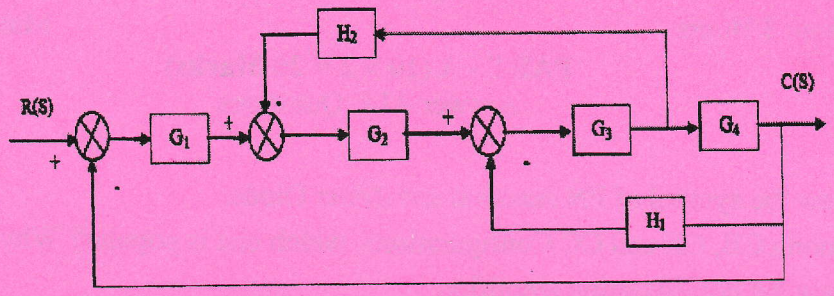
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

13. a) Describe the operation of a DAC.What is the advantage of R/2R ladder DACs over those that use binary weighted resistors?Discuss the applications of DAC. *13,K2,CO3*

OR

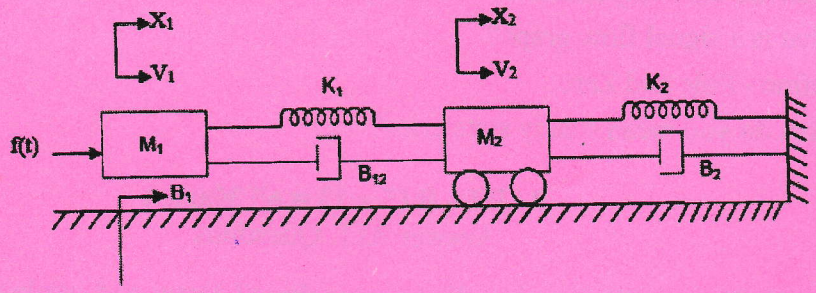
b) Describe the working of successive approximation and flash ADC. *13,K2,CO3*

14. a) Using Block diagram reduction technique find the transfer function for the system shown in fig. *13,K3,CO4*



OR

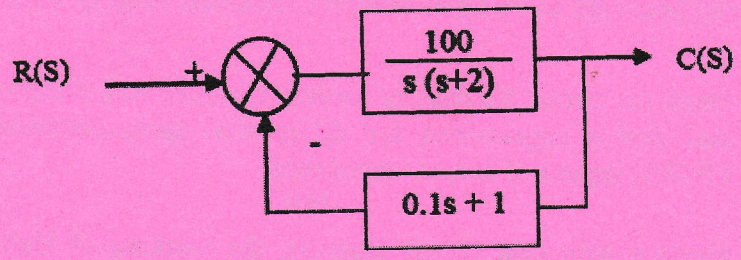
b) Write the differential equation governing the mechanical translational systems and find the transfer function. Draw the force voltage and force current electrical analogies. *13,K3,CO4*



15. a) Derive the expressions for second order system for under damped case and when the input is unit step. *13,K3,CO5*

OR

b) A positional control system with velocity feedback is shown in fig. What is the response of the system for unit step input? *13,K3,CO5*



PART - C (1 × 15 = 15 Marks)

16. a (i) A 5-bit DAC has a current output. For a digital input of 101000, an output current of 10mA is produced. What will I_{OUT} be for a digital input of 11101? *10,K3,CO3*

(ii) What is the largest value of output voltage from an 8-bit DAC that produces 1.0V for a digital input of 00110010? *5,K3,CO3*

OR

b) Assume the following values for the Digital Ramp ADC clock frequency = 1 MHz; VT = 0.1 mV; DAC has F.S. output = 10.23 V and a 10-bit input. Determine the following values. a. The digital equivalent obtained for VA = 3.728 V. b. The conversion time. c. The resolution of this ADC. *15,K3,CO3*