Question Paper Code | 12340

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023
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.	Differentiate between intrinsic and extrinsic semiconductor.	2,K2,CO1
2.	Give the two important characteristics of JFET.	2,K2,CO1
3.	Mention the characteristics of an ideal op-amp.	2,K1,CO2
4.	Define CMRR of an op-amp.	2,K1,CO2
5.	Draw a sample and hold circuit.	2,K2,CO3
6.	List out the direct type ADCs.	2,K1,CO3
7.	Distinguish between open loop and closed loop system.	2,K2,CO4
8.	Define transfer function.	2,K1,CO4
9.	What is weighing function?	2,K1,CO5
10.	How the system is classified depending on the value of damping?	2,K2,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) With a neat diagram explain the working of a PN junction diode in forward bias and reverse bias and show the effect of temperature on its V-I characteristics.   13,K2,CO1

OR

   b) Explain the working of the Common Emitter transistor and obtain the characteristics.   13,K2,CO1

12. a) (i) Explain Inverting amplifier with neat sketch.   5,K2,CO2
    (ii) Explain Non-inverting amplifier with neat sketch.   5,K2,CO2
    (iii) Mention the applications of Operational amplifier.   3,K1,CO2

OR

   b) Explain Differentiator with neat sketch.   13,K2,CO2

13. a) (i) Explain Sample and hold circuit with neat sketch.   7,K2,CO3
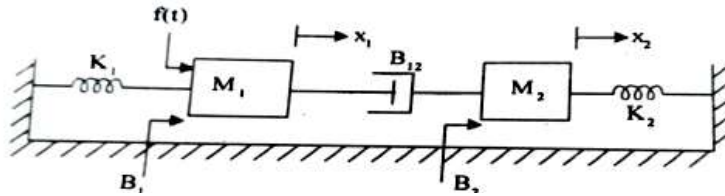   (ii) Explain Peak detector with neat sketch.   6,K2,CO3

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **12340**

b) Explain in details about successive approximation and dual slope type ADC with neat diagram. *13,K2,CO3*

14. a) Compute the differential equations governing the mechanical system shown in fig. and determine the transfer function. *13,K3,CO4*

OR

b) Compute the differential equations governing the mechanical rotational system shown in fig. and determine the transfer function. Draw the torque-voltage and torque-current electrical analogous circuits *13,K3,CO4*
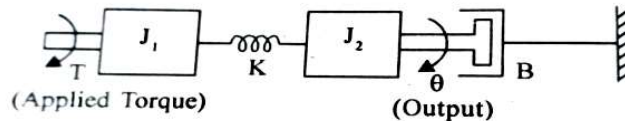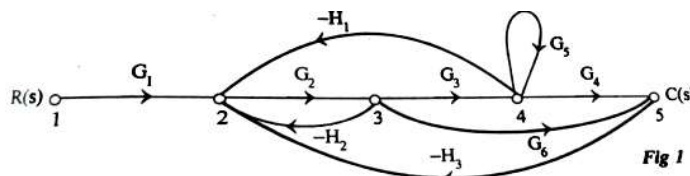

15. a) Derive the response of undamped second order system for unit step input. *13,K2,CO5*

OR

b) Derive the response of first order system for unit step input. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Calculate the overall gain $C(s)/R(s)$ for the signal flow graph shown in fig. *15,K3,CO4*

OR

b) The response of a servomechanism is $c(t)= 1+0.2e^{-60t}-1.2e^{-10t}$ when subject to a unit step input. Obtain an expression for closed loop transfer function. Determine the undamped natural frequency and damping ratio. *15,K2,CO5*