QP Code: R253G059 | Reg. No | | | | | | | | | | | AY 24

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)

M.Sc. (Third Semester – Regular) Examinations, December – 2025

24MPHPC23002 – ELECTRONICS

(Physics)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Write the statement of Thevenin's theorem?	CO1	K1
b. Differentiate between JFET and MOSFET.	CO2	K1
c. State Barkhausen criterion for sustained oscillation.	CO3	K2
d. Define common-mode rejection ration (CMRR).	CO4	K1
e. Draw the circuit diagram and truth table for EX-NOR gate.	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions		Marks	CO #	Blooms Level
2. a.	Define hybrid parameters.	2	CO1	K1
b.	How is a transistor represented as a two port device? Derive the hybrid parameters for a basic transistor circuit in any configuration and give its hybrid model?	8	CO1	K2
	(OR)			
c.	Define α (alpha) for a BJT transistor.	2	CO1	K1
d.	With the help of input and output characteristics, discuss the operating regions of a PNP transistor. How does proper biasing locate the Q-point in the desired region?	8	CO1	K2
3.a.	What is the need of amplifiers?	2	CO2	K1
b.	Explain the basic structure of a MOSFET and Discuss the static characteristics and transfer characteristics of a MOSFET.	8	CO2	K2
	(OR)			
c.	Draw and explain the collector-to-base bias (feedback bias) circuit. Show how negative feedback helps in stabilizing the operating point. Derive the expression for the stability factor and explain its significance.	10	CO2	K2
4.a.	What do you mean by oscillators? Write its various types.	3	CO3	K1
b.	Draw the circuit diagram of RC oscillator and explain its working. Obtain the necessary condition for maintained oscillations?	7	CO3	K2
	(OR)			

c.	Explain the construction and working principle of a crystal oscillator. Derive the equivalent circuit and explain why it provides high frequency stability.	10	CO3	K2
5.a.	What is an operational amplifier?	2	CO4	K1
b.	Describe the working of summing and integrating amplifier using operational amplifier with a circuit diagram.	8	CO4	K2
	(OR)			
c.	Compare ideal and practical op-amps in terms of input impedance, output impedance, gain, CMRR, and bandwidth.	10	CO4	K2
6.a.	What do you mean by the FLIP FLOP?	2	CO5	K1
b.	Draw the circuit of an SR flip-flop, clocked SR flip-flop and an SR flip-flop converted into a JK flip-flop. Explain its operation and write its truth table.	8	CO5	K2
	(OR)			
c.	Define the Convertors. Explain the D/A Convertors using logic levels used in a 4 bit R-2R ladder DAC are: 1= E V and 0 = 0 V and find the output voltage for inputs (a) 1000 (b) 0100 (c) 0010 and (d) 0001.	10	CO5	K2

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