GIET UNIVERSITY, GUNUPUR – 765022

M. Tech (First Semester) Examinations, January – 2024

MPEVL1031– Analog IC Design

(VLSI Design)

Time: 3 hrs Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

	Q1 Answer all the Questions	CO#	Blooms Level
a.	What is high-speed op-amp?	CO1	K3
b.	What is the structure of a MOSFET and its VI characteristic?	CO2	K1
c.	What is the Miller effect?	CO3	K3
d.	What is Analog IC Design?	CO4	K1
e.	Differentiate between Basic, Cascode and Active current mirrors.	CO3	K3
f.	What is the slew rate of an OP-amp?	CO2	K1
g.	Differentiate between differential amplifier and multistage amplifier.	CO1	K3
h.	Why do op-amps fail at high frequency?	CO4	K1
i.	What is MOS?	CO1	K3
j.	What is the feedback topology of an op-amp?	CO2	K1

PART – B **(10 x 5=50 Marks)**

Answer ***ANY FIVE*** questions

		Marks	CO#	Blooms Level
2. a.	Describe the feedback topology of an operational amplifier, emphasizing its role in enhancing performance and stability.	5	CO1	K2
b.	Compare and contrast the characteristics of PMOS and NMOS transistors, considering their strengths and weaknesses in electronic circuit applications.	5	CO1	K4
3.a.	Explore the distinctions between Source-Insensitive Biasing (SIB) and Temperature-Insensitive Biasing (TIB) in amplifier circuits, discussing their respective advantages and limitations.	5	CO2	K2
b.	Write a comprehensive note comparing one-stage and two-stage operational amplifiers, considering their advantages, disadvantages, and typical applications.	5	CO2	K2
4. a.	Explain the four ideal parameters of an operational amplifier, discussing common characteristics that contribute to ideal op-amp behavior.	5	CO3	K1
b.	Explain the differences between Cascode and Wilson Current Mirrors, highlighting their respective advantages and applications.	5	CO3	K2

5.a.	Provide insights into the purpose and function of a current mirror in amplifier design, discussing how it contributes to maintaining current consistency.	5	CO4	K3
b.	Explain the factors contributing to noise in operational amplifiers, and discuss techniques to mitigate noise in amplifier designs.	5	CO4	K2
6. a.	Describe the Common-Mode Rejection Ratio (CMRR) in the context of operational amplifiers, discussing its importance in minimizing unwanted signal components.	5	CO2	K4
b.	Provide an in-depth explanation of MOS I/V characteristics, outlining the voltage-current relationship and key features of Metal-Oxide-Semiconductor devices.	5	CO3	K2
7.a.	Explore the significance of trans-impedance amplifiers in MOS circuits, describing their applications and advantages in specific electronic designs.	5	CO2	K4
b.	Write a comprehensive note on the Cascode Stage, delving into its structure, operation, and practical applications in amplifier circuits.	5	CO2	K2
8. a.	Discuss the operational principles of CS (Common-Source) and CG (Common-Gate) amplifiers, highlighting their key characteristics and use cases.	5	CO1	K2
b.	Elaborate on the concept of a multistage amplifier, discussing its significance and providing insights into its design considerations.	5	CO2	K1

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