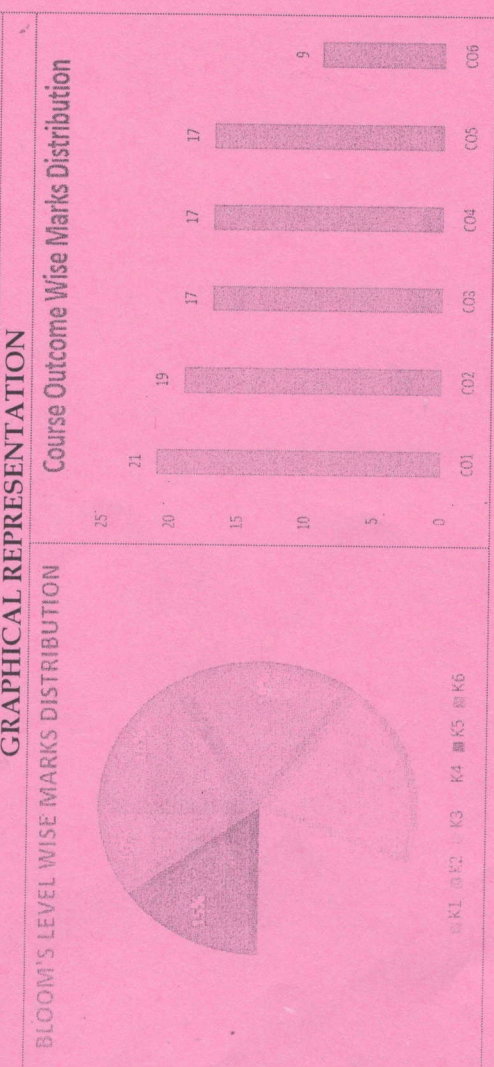


Branch	Electrical and Electronics Engineering	Program	B.Tech
Subject Name	VLSI Circuits	Semester	VIII
		Year	April 2024
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> <li>Start writing from 2nd page onwards; don't Write on the 1st Page Backside</li> <li>Answer all Questions of Section A (Compulsory)</li> <li>Answer Any Four out of Six of Section B</li> <li>Answer Any Three out of Five of Section C</li> <li>Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under <u>Unfair Means</u> and will Result in the <u>Cancellation of the Papers.</u></li> </ul>		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

CO1	Recognize the scale of integration for VLSI design.	PO - Program Outcome
CO2	Understanding the processes for VLSI fabrication.	
CO3	Solve the performance issues in circuit layout.	
CO4	Analyze circuits using both analytical and CAD tools.	
CO5	Interpret logic circuits with different design styles.	
CO6	Create appropriate automation algorithms for partitioning, floor planning, placement and routing.	



**Section A (Each question Carry 02 Marks from Q1-i to x) - 20 Marks**

Q. N1	QUESTIONS	Marks	COS	KL	PO
i	Give the expression for drain current of a MOS in linear mode.	2	CO1	K1	PO1
ii	Draw the pull-up and pull-down networks in CMOS logic gates?	2	CO3	K3	PO1
iii	How does the drain current change with respect to the gate-source voltage in the saturation region?	2	CO1	K3	PO1
iv	What is meant by "scaling" in the context of MOSFET technology?	2	CO1	K2	PO1
V	Give an expression for aspect ratio of a chip.	2	CO2	K3	PO2
vi	Design a CMOS logic for NAND gate.	2	CO5	K4	PO1
vii	Explain the concept of channel length modulation.	2	CO4	K2	PO2
viii	Why floor-plan is done in chip design?	2	CO6	K1	PO1
ix	What is dynamic CMOS gate?	2	CO6	K1	PO2
x	Give the condition at which pMOS operates in linear and saturation mode.	2	CO2	K4	PO1



**Section B (Answer any FOUR out of SIX) - 20 Marks**  
(Each question Carries 5 Marks)

Q. No.	QUESTIONS	Marks	COS	KL	PO
2	Why surface inversion is an essential condition for MOS operation?	5	CO2	K2	PO1
3	What is scaling? Explain constant electric field scaling with 2 parameters.	5	CO1	K2	PO2
4	Discuss in detail the concept of floor planning and its various constraint.	5	CO6	K3	PO2
5	Draw and explain the layout for CMOS 2-input NOR gate.	5	CO5	K2	PO2
6	The simplified CMOS circuit diagram is given below. Find an equivalent equivalent (W/L) ratio for nmos and pmos network, assuming that $(W/L)_p = 15$ for all pMOS transistors and $(W/L)_n = 10$ for all nMOS transistors.	5	CO4	K5	PO1
7	Explain any two of the following: i. Ion implantation ii. Photolithography iii. Oxidation	5	CO3	K4	PO1

**Section C (Answer any THREE out of FIVE) - 30 Marks-**  
(Each question Carries 10 Marks)

Q. No.	QUESTIONS	Marks	COS	KL	PO
8	Describe in details the steps involved in the fabrication of NMOS.	10	CO2	K1	PO1
9	Derive an expression for drain current in n-channel MOSFET for Linear mode operation.	10	CO1	K3	PO2
10	Design a resistive load inverter and discuss the VTC curve for the same.	10	CO3	K6	PO1
11	Draw the circuit diagram; stick diagram and layout for CMOS inverter.	10	CO5	K5	PO2
12	Design a complementary static CMOS XOR gate at the transistor level. The XOR gate Boolean expression F has five literals and is $F = (A/B + C'(D+E))'$	10	CO4	K4	PO1



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**END TERM EXAMINATION**  
School of Engineering & IT

Branch	Electrical and Electronics Engineering	Program	B.Tech
Subject Name	Electrical Materials	Semester	VIII
		Year	April 2024

Time: 3 Hour  
Max. Marks : 70

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- Answer all Questions of Section A (Compulsory)
- Answer Any Four out of Six of Section B
- Answer Any Three out of Five of Section C
- Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under Unfair Means and will Result in the Cancellation of the Papers.

Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Define Villari effect.	2	CO1	K1	PO2
ii	Enlist the types of magnetic material.	2	CO1	K3	PO1
iii	What do you mean by doping for semiconductor materials.	2	CO2	K3	PO3
iv	Why Magnetostriction is a Reversible Process?	2	CO2	K5	PO4
v	Define diffusion current.	2	CO3	K1	PO3
vi	Enlist the types of semiconductors.	2	CO3	K2	PO2
vii	What do you mean by the Meissner effect.	2	CO4	K1	PO4
viii	Define flux-Pinning.	2	CO4	K2	PO4
ix	What do you mean by High temperature semiconductor (HTS).	2	CO5	K4	PO5
x	Write down the application of Epoxy/Fiberglass.	2	CO5	K6	PO6

CO- Course Outcomes, KL- Knowledge Level, PO - Program Outcome

CO1	Select insulating, conducting and magnetic materials used in electrical machines.
CO2	Understand the properties of liquid, gaseous and solid insulating materials.
CO3	Apply the physics behind the electrical engineering materials.
CO4	Analyze the electrical properties and characteristics of various materials, used in the electrical appliances, devices & instruments.
CO5	Create innovative research in the field of electrical engineering material science.

**GRAPHICAL REPRESENTATION**

**Bloom's Level wise Marks Distribution**

■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

**Course Outcome Wise Marks Distribution**

■ CO1 ■ CO2 ■ CO3 ■ CO4 ■ CO5



**Section B (Answer any FOUR out of SIX) – 20 Marks**  
(Each question Carry 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Write down the difference between direct and indirect band gap semiconductors	5	CO3	K3	PO1
3	Describe the different methods of carrier generation and recombination	5	CO3	K1	PO1
4	Explain briefly about doping of semiconductor materials	5	CO5	K4	PO4
5	Discuss briefly about atomic concept of ferromagnetism	5	CO5	K5	PO2
6	Write down the application of Semiconductors	5	CO6	K1	PO5
7	Write short notes on Cross-linked Polyethenes (XLPE) Polytetrafluoroethylene (Teflon/PTFE).	5	CO4	K6	PO6

**Section C (Answer any THREE out of FIVE) – 30 Marks-**  
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Describe briefly about dielectric properties of insulating materials	10	CO3	K3	PO1
9	Explain briefly the atomic and lattice structure of Intrinsic Semiconductors Materials	10	CO2	K4	PO4
10	Explain briefly about Fermi Energy and Carrier Concentration	10	CO5	K2	PO4
11	Describe briefly about Meissner Effect in Perfect Diamagnetic and Superconductor material	10	CO6	K3	PO5
12	Explain briefly about classification and application of Synthetic rubber	10	CO4	K6	PO6

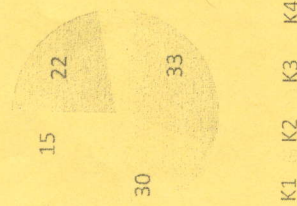


Course Outcomes, KL- Knowledge Level, PO – Program Outcome

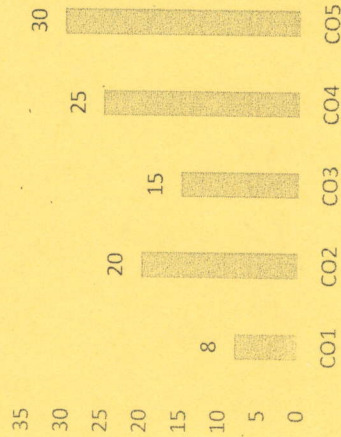
CO1	Recognize the operation of power electronic converters and their control strategies.
CO2	Understand the vector control strategies for ac motor drives.
CO3	Implement the control strategies using digital signal processors.
CO4	Analyze the various drives for AC machines.
CO5	Evaluate the performance parameters for AC drives.

**GRAFICAL REPRESENTATION**


**Bloom's Level Wise Marks Distribution**




**Course Outcomes Wise Marks Distribution**



06/05/24 M 30



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<b>Branch</b>	Electrical and Electronics Engineering	<b>Program</b>	B. Tech
<b>Subject Name</b>	Advanced Electric Drives	<b>Semester</b>	VIII
		<b>Year</b>	April 2024

**Time: 3 Hour**  
**Max. Marks: 70**

- Start writing from 2nd page onwards; don't Write on the 1st Page Backside
- Answer all Questions of Section A (Compulsory)
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<b>Knowledge Level (KL)</b>	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

**Section A (Each question Carry 02 Marks from Q1-i to x) – 20 Marks**

Q. N 1	QUESTIONS	Marks	COs	KL
i	Why do we go for PWM inverter control?	2	CO2	K1
ii	What are the advantages of high voltage dc system over high voltage ac system?	2	CO2	K2
iii	What are the classifications of PWM technique?	2	CO1	K1
iv	Write short notes on inverter rectifier.	2	CO2	K1
v	What is forced commutation?	2	CO1	K1
vi	Give some applications of phase control converters.	2	CO1	K2
vii	Mention the two slip-power recovery schemes.	2	CO2	K1
viii	What is firing angle?	2	CO1	K1
ix	What is a chopper?	2	CO2	K1
x	What are the limitations of cyclo converter method of speed control?	2	CO1	K1



**Section B (Answer any FOUR out of SIX) – 20 Marks**  
(Each question Carries 5 Marks)

	negligible. The inductances of the armature and field circuits are sufficient to make the armature and field currents continuous and ripple free. If the delay angle of the armature converter is $\alpha = 60^\circ$ and armature current is $I_a = 45$ A, determine:	
	i) The electromagnetic torque, $T_e$ , developed by the motor.	
	ii) The speed, $\omega$	
	iii) The input PF of the drive.	

Q. No.	QUESTIONS	Marks	COs	KL
2	Why DSP is needed in motor control Theory. Explain briefly.	5	CO2	K5
3	Derive the relationship between voltage and frequency in case of constant $V/f$ controlled IM.	5	CO2	K4
4	Explain Speed Control of DC Motor – Using Converters.	5	CO3	K4
5	Distinguish between AC Drive and DC Drive.	5	CO3	K4
6	Draw the block diagram of Electric Drive. Explain each component in brief.	5	CO4	K4
7	A 200V, 875 rpm, 150A separately excited dc motor has an armature resistance of 0.06Ω. It is fed from a single-phase fully controlled rectifier with an ac source voltage of 220V, 50 Hz. Assuming continuous conduction, calculate (i) Firing angle for rated motor torque and 750 rpm. (ii) Firing angle for rated motor torque and -500 rpm (iii) Motor speed for $\alpha = 160$ and rated torque.	5	CO3	K4

**Section C (Answer any THREE out of FIVE) – 30 Marks-**  
(Each question Carries 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain in detail the four quadrant operation of an electric drive.	10	CO5	K3
9	Explain the construction & working principle of Permanent Magnet Brushless DC motor.	10	CO5	K5
10	Describe the indirect vector control scheme with block diagrams.	10	CO4	K6
11	Explain the operation of wound field synchronous motor with neat diagram.	10	CO4	K2
12	The speed of a separately excited dc motor is controlled by a single-phase full-wave converter. The field circuit is also controlled by a full converter and the field is set the maximum possible value. The ac supply voltage to the armature and field converter is one phase, 440 V, 60 Hz. The armature resistance is $R_a = 0.25 \Omega$ , the field circuit resistance is $R_f = 175 \Omega$ , and the motor voltage constant is $K_v = 1.4$ V/A rad/s. The armature current corresponding to the load demand is $I_a = 45$ A. The viscous friction and no-load losses are	10	CO5	K3