

		ARKA JAIN University Jharkhand				[21-06-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Electrical and Electronics Engineering			Branch	B.Tech		
Subject Name	Digital Electronics			Session	Even, 2024-2025		
Semester	IV			Year	June, 2025		
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 <u>Mobile Phone</u> or any kind of <u>Written Material, Arguments</u> with the <u>Invigilator</u> or <u>Discussion</u> with <u>Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u> .			
Knowledge Level (KL)	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	Convert $(215)_{10}$ and $(235)_{10}$ into hexadecimal numbers.	2	CO2	K1	
ii	Enlist the name of number systems.	2	CO2	K2	
iii	Write any four applications of Flip-Flops	2	CO1	K1	
iv	Define Number System.	2	CO2	K1	
v	Write any four differences between digital and analog Systems.	2	CO1	K1	
vi	What is Gray code?	2	CO1	K2	
vii	State the De Morgan's Theorem.	2	CO2	K1	
viii	What is a Logic gate?	2	CO2	K1	
ix	List the properties of Boolean Algebra?	2	CO2	K1	
x	Write the types of A/D converters.	2	CO2	K1	

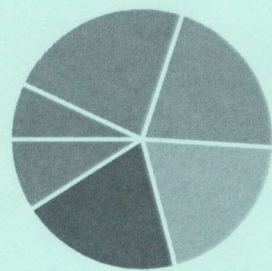
Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 5 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Sketch the logic circuit of Half subtractor.	05	CO2	K5
3	Simply the function $F(A,B,C,D,E) = \sum m(1,4,6,10,20,22,24,26) + d(0,11,16,27)$ using K-map method. Draw the circuit of the minimal expression using Basic gates.	05	CO2	K4
4	Draw and explain the logic diagram of Multiplexer and Demultiplexer	05	CO3	K4
5	Explain the following Logic Gates with diagram and Truth Table. i. AND Gate ii. OR Gate	05	CO3	K4
6	Compare the function of decoder and encoder.	05	CO4	K4
7	Give the comparison between synchronous & Asynchronous counters	05	CO3	K4
Section C (Answer any THREE out of FIVE) - 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Draw and explain the state diagram of synchronous and asynchronous counter.	10	CO5	K3
9	Describe the functioning a J K-Flip Flop with its logical circuit.	10	CO5	K5
10	Find the Minimized logic function using K-Maps. $F(A, B, C, D) = \sum m(1,3,5,8,9,11,15) + d(2,13)$. Implement the minimal SOP using NAND gates.	10	CO4	K6
11	(i) Design OR and AND function using 2:1 MUX (ii) Construct 4x16 decoder with two 3x8 decoders.	10	CO4	K2
12	Explain the working principle of dual slope type A/D converter.	10	CO5	K3

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

CO1	Identify the fundamental concepts and techniques used in digital electronics.
CO2	Understand the process of Analog to Digital conversion and Digital to Analog conversion.
CO3	Apply the defined technique to structure various number systems.
CO4	Examine the structure of various number systems and its application in digital design.
CO5	Interpret the use of PLDs to implement the given logical problem.
CO6	Design and implement Combinational and Sequential logic circuits.

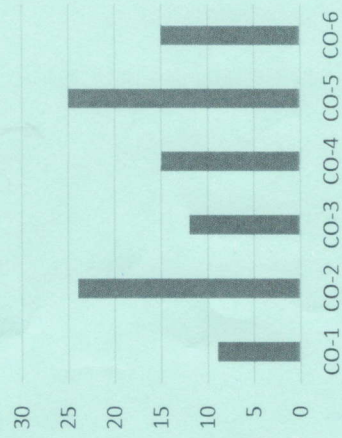
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



 ARKA JAIN University Jharkhand		 NAAC GRADE A ACCREDITED UNIVERSITY		[24-06-2025] END SEM EXAMINATION School of Engineering & IT	
Program	Electrical and Electronics Engineering		Branch	B. Tech	
Subject Name	Electrical Machines-II		Session	Even, 2024-2025	
Semester	IV		Year	June, 2025	
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 <u>Mobile Phone</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussion with Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Paper(s)</u> .					
Knowledge Level (KL)	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	QUESTIONS	Marks	COs	KL
1				
i	Differentiate between concentrated and distributed windings..	2	CO1	K1
ii	For a 3-phase, 6-pole, 36-slot AC machine, calculate: (a) Slot angle (b) Coil span (for full pitch and short pitch)	2	CO3	K5
iii	What is a pole pitch? How is it calculated?	2	CO1	K1
iv	Differentiate between pulsating and revolving magnetic fields.	2	CO2	K2
v	A 3-phase, 6-pole induction motor operates on a 50 Hz supply. Calculate Synchronous speed of the revolving magnetic field.	2	CO5	K5
vi	Write differences between squirrel cage and wound rotor induction motors.	2	CO5	K2
vii	Explain working principle of induction motor.	2	CO4	K1
viii	A 3-phase, 400 V, 50 Hz, 6-pole induction motor is operating with a slip of 4%. Calculate Rotor frequency and Rotor speed.	2	CO1	K4
ix	How are alternators classified?	2	CO4	K1
x	Define the voltage regulation in synchronous machine.	2	CO1	K4

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Compare and contrast lap and wave windings used in AC machines.	05	CO3	K5
3	Explain the torque-slip characteristics of an 3-phase induction motor.	05	CO4	K3
4	Explain the principle of star-delta starting of induction motors. Discuss its advantages and disadvantages.	05	CO5	K3
5	With proper mathematical expressions and diagrams, explain the principle of the rotating magnetic field in a three-phase induction motor.	05	CO2	K6
6	Explain double revolving field theory in case of 1-phase induction motor.	05	CO2	K2
7	Draw the phasor diagram of Salient Pole Synchronous Machine and explain the concept of direct axis reactance and quadrature axis reactance.	05	CO6	K6

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

Q. No.	QUESTIONS	Marks	COs	KL
8	A 4-pole, 3-phase induction motor operates from supply whose frequency is 50Hz, calculate (a) The speed of the rotor when slip is 0.04, (b) Frequency of the rotor currents when slip is 0.04, (c) Frequency of rotor at stand still, (d) If power input is 75kW, then rotor copper loss per phase and (e) Mechanical power developed.	10	CO4	K5
9	Derive the expression of torque under running condition and also find out the condition for maximum torque in case of 3-phase induction motor.	10	CO3	K5
10	Explain the equivalent circuit of a 1-phase induction motor. Also explain the split phase starting method.	10	CO1	K4
11	The effective resistance of a 1200kVA, 3.3-kV, 50 Hz, 3-phase, Y-connected alternator is 0.25 ohm/phase. A field current of 35A produces a current of 200A on short circuit and 1.1kV (line to line) on open circuit. Calculate the power angle and p.u. change in magnitude of terminal voltage when load of 1200 kVA at 0.8 p.f is thrown off. Draw the corresponding phasor diagram.	10	CO6	K5
12	Explain two reaction theory in case of Salient pole machine and its impact with phasor diagram.	10	CO6	K4

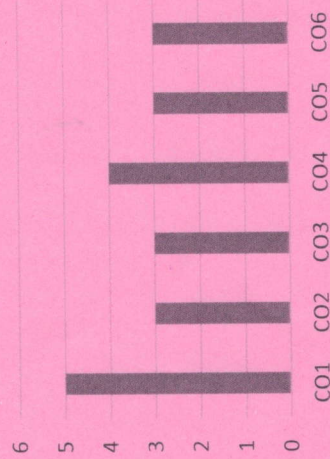
Course Outcomes	CO1	CO2	CO3	CO4	CO5	CO6
Recognize different electrical machine.						
Understand the operation of ac machines.						
Apply the concepts of rotating magnetic fields to find characteristics of Induction motor.						
Ability to conduct experiments on Ac Machines to find the Characteristics.						
Evaluate performance characteristics of ac machines.						
Modify the characteristics of operation of Synchronous motor.						

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



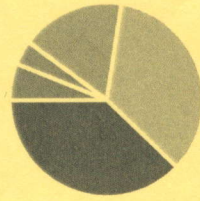
Course Outcome wise Marks Distribution



CO1	Recall the operation of DC-DC choppers.
CO2	Understand the differences between signal level and power level devices.
CO3	Apply the concept of commutation to turn off converter circuits.
CO4	Analyze the operation of voltage source inverters.
CO5	Choose suitable power electronic devices by assessing the requirements of application fields.
CO6	Design and implement Combinational and Sequential logic circuits.

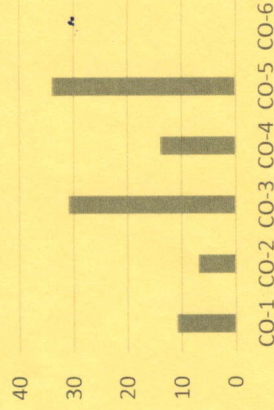
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution

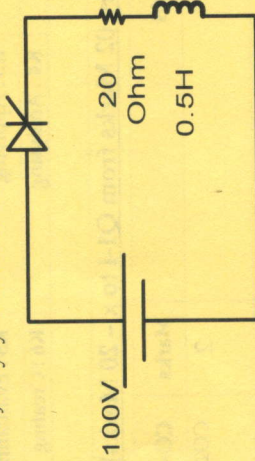


 ARKA JAIN University Jharkhand		 NAAC GRADE A ACCREDITED UNIVERSITY		[26-06-2025] END SEM EXAMINATION School of Engineering & IT	
Branch	Electrical and Electronics Engineering	Program	B. Tech		
Subject Name	Power Electronics	Session	Even 2024-2025		
Semester	IV	Year	June 2025		
Time: 3 Hour Max. Marks : 70		• Start writing from 2nd page onwards; don't Write on the 1st Page * <u>Backside</u> • 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 Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Paper(s).			
Knowledge Level (KL)	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)

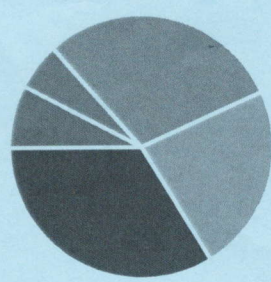
Q.N	QUESTIONS	Marks	COs	KL
i	Define Peak time rise time.	2	CO2	K1
ii	Difference between ideal and practical switch	2	CO5	K1
iii	How to protect the thyristor from over voltage?	2	CO3	K2
iv	What is natural commutation? Give some example	2	CO3	K1
v	List some applications power electronics device?	2	CO1	K2
vi	What are difference between VSI and CSI?	2	CO4	K1
vii	What are the function of gate circuit?	2	CO4	K5
viii	Why 120 degree conduction mode is superior then 180 conduction mode	2	CO4	K4
ix	Define chopper and its application	2	CO5	K4
x	What are the function of snubber circuit?	2	CO3	K3

- (b) Voltage across the main thyristor when it gets commutated and
(c) The circuit turn-off time for the main thyristor

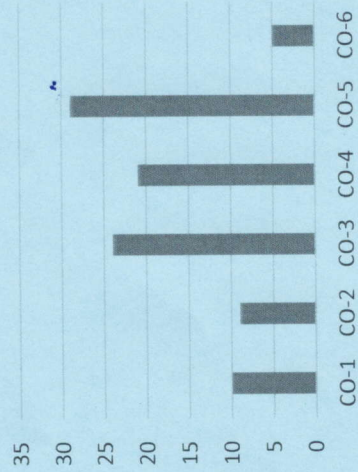
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Explain dynamic characteristics of SCR.	05	CO2	K4
3	Explain turn off characteristics of SCR	05	CO5	K3
4	Explain class D- commutation	05	CO3	K5
5	Explain the operation of single phase half wave controlled rectifier with 'RL' load with proper wave	05	CO3	K5
6	For the given circuit, the thyristor is gate with a of 50mA and the duration of firing pulse is 50 μ sec. Justify will SCR be ON or not	05	CO5	K5
				
7	Write a short note on dv/dt triggering	05	CO3	K4
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the operation of three phase voltage source inverter with 180° conduction mode	10	CO4	K4
9	Explain the operation of single phase fully controlled rectifier with R load and also derive the average and RMS load voltage.	10	CO5	K3
10	Explain working principle of boost converter and derive the expression of average load voltage and current	10	CO1	K5
11	Explain the different method of protection of thyristor	10	CO5	K5
12	A class-B commutation has $C = 20 \mu F$ and $L = 5 \mu H$. Initial voltage across capacitor is $V_c = 230 V$. For a constant load current of 300 A, calculate (a) Conduction time for the auxiliary thyristor,	10	CO3	K4

CO- Course Outcomes,	KL- Knowledge Level,	PO – Program Outcome
Course Outcomes	CO1	Recognize sampling theorem and its implications.
	CO2	Understand the concepts of continuous time and discrete time systems
	CO3	Solve systems in complex frequency domain.
	CO4	Analyze the discrete time signals and system using different transform domain techniques.
	CO5	Evaluate the various signal responses.
	CO6	Design and implement LTI filters for filtering different real world signals
GRAPHICAL REPRESENTATION		

Bloom's level wise Marks Distribution



Course Outcome wise Marks Distribution



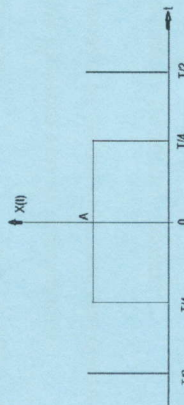
■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

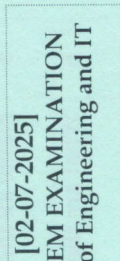
JGI ARKA JAIN University Jharkhand		NAAC GRADE A ACCREDITED UNIVERSITY		[30-06-2025] END SEM EXAMINATION School of Engineering & IT	
Branch	Electrical and Electronics Engineering		Program	B. Tech	
Subject Name	Signals & Systems		Session	Even 2024-2025	
Semester	IV		Year	June 2025	
Time: 3 Hour Max. Marks : 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 Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Paper(s).			
Knowledge Level (KL)	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	QUESTIONS	Marks	COs	KL
i	Define the term Signals and systems.	2	CO2	K3
ii	Enlist any two applications of the Z-transform.	2	CO5	K2
iii	Write any two properties of convolution?	2	CO3	K1
iv	Define a static and dynamic system.	2	CO3	K1
v	What is meant by signum function? Explain	2	CO2	K2
vi	Define a causal system.	2	CO4	K1
vii	Give the expression for inverse Fourier transform.	2	CO4	K1
viii	Derive a relationship for convolution sum for discrete time signals.	2	CO4	K4
ix	Define the term aliasing.	2	CO5	K3
x	Discuss about the basic types of Signals.	2	CO5	K2

Section B (Answer any FOUR out of SIX) - 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Compare between continuous time signal and discrete time signal convolution	05	CO2	K3
3	Find the folded sequence of $x(n) = \{-3, 4, 3, -1\}$	05	CO4	K4
4	Obtain the Fourier Transform and spectrums of Following Signals i) $x(t) = \cos \omega_0 t$ ii) $x(t) = \sin \omega_0 t$	05	CO3	K5
5	Determine whether the following systems is linear or non linear i) $y(t) = x(-t)$ ii) $y(t) = x(2t)$	05	CO3	K5
6	Consider a discrete time system with input $x(n]$ and output $y(n]$ related by $y(n) = x(n)x(n-2)$ Is this system linear?	05	CO5	K5
7	State the difference between the step response and the impulse response of an LTI system.	05	CO6	K4
Section C (Answer any THREE out of FIVE) - 30 Marks- (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Determine which of the following signals are periodic. If the signal is periodic find the fundamental period i) $g(t) = 8\sin(400\pi t)$ ii) $g(t) = 5 + t^2$	10	CO5	K4
9	a) Obtain the Fourier Transform of Following Functions i) $x(t) = \delta(t)$ b) Discuss about the properties of Fourier Transform.	10	CO4	K3
10	If $x(t) = u(t)$ and $h(t) = u(t)$ find output $y(t) = x(t) * h(t)$	10	CO3	K5

11	 Obtain the Fourier series representation of the given periodic rectangular waveform. State and prove the sampling theorem. Discuss the importance of Sampling Theorem.	10	CO5	K5
12		10	CO1	K3

	ARKA JAIN University Jharkhand		[02-07-2025] END SEM EXAMINATION School of Engineering and IT
Program	Electrical and Electronics Engineering	Branch	B. Tech
Subject Name	Essence of Indian Knowledge and Tradition	Session	Even, 2024-2025
Semester	IV	Year	June, 2025
Time: 1.5 Hour Max. Marks : 35			
- Start writing from 2nd page onwards; don't Write on the 1st Page Backside - Answer all Questions of Section A (Compulsory) - Answer Any Five out of Six of Section B - Answer Any Two out of Four of Section C - Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Papers.</u>			
Knowledge Level (KL)		K1 : Remembering K2 : Understanding K3 : Applying K4 : Analysing K5 : Evaluating K6 : Creating	

Section A (Each question Carry 01 Marks from Q1-i to v) – 05 Marks			
Q. N	QUESTIONS	Marks	COs
1			KL
i	What do you understand by Indian Knowledge & Tradition System?	01	CO1
ii	What do you mean by the term Veda?	01	CO1
iii	Yajur Veda in Sanskrit is also known as.....	01	CO2
iv	Who are indigenous people?	01	CO2
v	Gayatri Mantra is associated with Veda.	01	CO3
			K1
Section B (Answer any FIVE out of SIX) – 10 Marks (Each question Carry 02 Marks)			
Q. No.	QUESTIONS	Marks	COs
2	In which Veda, the term Statecraft is mentioned.	02	CO1
3	Into how many parts Yajur Veda is divided? Name them.	02	CO3
4	Give one name of Itihaas and Purana each.	02	CO2

5	Name all the upvedas.	02	CO4	K1
6	What are the teachings of Sama Veda?	02	CO4	K3
7	Why there is a need to protect Indian Knowledge System?	02	CO2	K2
Section C (Answer any TWO out of FOUR) – 20Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Write the basic structure of Indian Knowledge System.	10	CO1	K2
9	Explain in detail Ayurveda.	10	CO3	K1
10	Explain the term Jyotish, Vyakaran, Chhand and Shiksha in Vedanga.	10	CO3	K1
11	Explain what is Dharamshastra?	10	CO2	K3

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

Course Outcomes	CO1	Basic principles of thought process, reasoning and differencing.
	CO2	Understand the Indian Knowledge Systems, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care systems.
	CO3	Understand the focuses on Indian philosophical traditions, Indian linguistic tradition and Indian artistic tradition.
	CO4	Evaluate the legal mechanism of traditional knowledge protection to show the difference between IPR and non-IPR system.

GRAPHICAL REPRESENTATION

