



ARKA JAIN
University
Jharkhand



END SEM EXAMINATION
School of Engineering & IT

Branch	Electrical and Electronics Engineering	Program	B.Tech
Subject Name	Power Electronics	Semester	IV
		Year	June 2024
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> 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 Graf Paper/ Drawing Sheet/ Log Book/ Ledger (please Mention if any) Possession of <u>Mobile Phones</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.</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 Q1-x) - 20 Marks					
Q.N	QUESTIONS	Marks	COs	KL	PO
1					
i	What is the purpose of di/dt protection?	2	C05	K2	PO3
ii	What is a natural or line commutation?	2	C03	K1	PO1
iii	Define extinction angle?	2	C03	K1	PO3
iv	What are the necessary conditions of turn-on of a SCR?	2	C05	K1	PO3
v	Difference between holding current and latching current?	2	C05	K2	PO2
vi	What is firing angle, conduction angle?	2	C04	K1	PO3
vii	Draw the circuit diagram of buck-boost chopper	2	C01	K1	PO2
viii	What is function of Crowbar circuit?	2	C02	K4	PO1
ix	What are the difference between natural commutation and force commutation?	2	C03	K3	PO3
x	What is sequential circuit?	2	C06	K1	PO2

Section B (Answer any FOUR out of SIX) - 20 Marks

(Each question Carry 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Write short notes on ideal switches	5	CO5	K1	PO2
3	Give the constructional details of Thyristor. Sketch its schematic diagram and its symbol.	5	CO2	K4	PO4
4	Explain R gate triggering circuits	5	CO3	K3	PO4
5	Derive the expression of switching losses?	5	CO5	K5	PO2
6	Explain the operation of midpoint rectifier with 'R' load.	5	CO3	K4	PO5
7	Explain any one of the turn off methods of SCR?	5	CO3	K3	PO4

Section C (Answer any THREE out of FIVE) - 30 Marks-

(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	What is commutation? Explain class D-commutation technique?	10	CO3	K4	PO4
9	Discuss the method of the turning-on method of SCR with gate disconnected.	10	CO2	K3	PO2
10	Explain operation principle three phase half wave controlled rectifier?	10	CO5	K1	PO2
11	Explain the operation of 120 degree conduction mode of three phase inverter?	10	CO4	K4	PO4
12	Describe different mode of operation of SCR with the help VI Characteristics.	10	CO5	K5	PO5

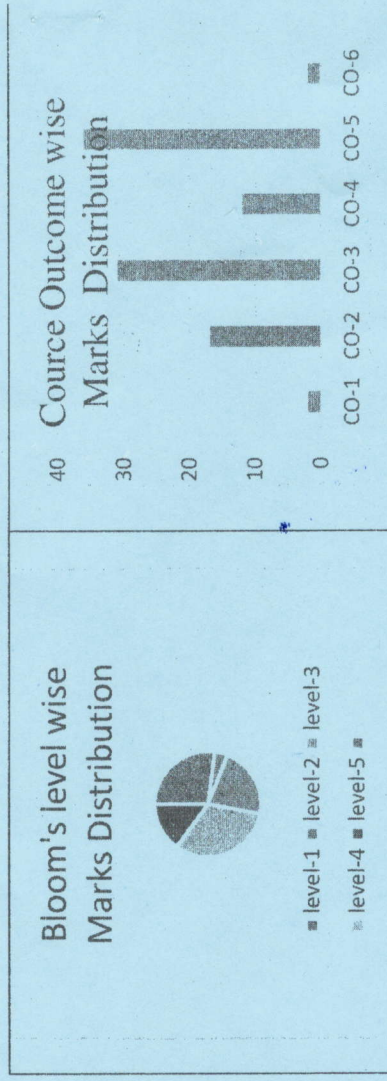
CO- Course Outcomes,



KL- Knowledge Level,

PO - Program Outcome

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

GRAPHICAL REPRESENTATION



	ARKA JAIN University Jharkhand				END SEM EXAMINATION School of Engineering & IT	
	Branch	Electrical and Electronics Engineering	Program	B.Tech	Semester	IV
Subject Name	Electrical Machine-II	Year	June 2024	• Start writing from 2nd page onwards; <u>don't Write on the 1st Page 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 <u>Mobile Phones</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussing with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Papers.</u>		
Time: 3 Hour Max. Marks: 70						
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating			
	K2 : Understanding	K4 : Analysing	K6 : Creating			

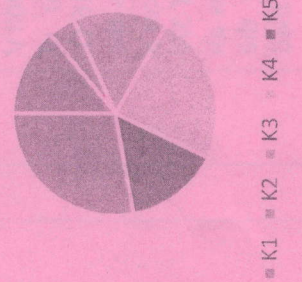
Q. N I	QUESTIONS	Marks	C Os	KL	PO
i	What do you mean by three phase induction motor and enlist the types of rotor?	2	CO 1	K1	PO2
ii	The frequency of the e.m.f in the stator of a 4 pole induction motor is 50 Hz, and that in the rotor is 1.5 Hz. What is the slip, and at what speed is the motor running?	2	CO 1	K3	PO1
iii	Define slip? Why cannot an induction motor run at synchronous speed?	2	CO 2	K3	PO3
iv	What do you mean by breadth factor?	2	CO 2	K5	PO4
	Define pitch factor. why are short-pitched coils used in alternator	2	CO 3	K1	PO3
vi	A 3-phase, 6-pole star-connected alternator revolves at 1000 r.p.m. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05 Wb. Calculate the voltage generated by the machine if the winding factor is 0.96?	2	CO 5	K2	PO2
vii	Define machine angle with proper phasor diagram for lagging power factor.	2	CO 4	K1	PO4
viii	What are V-curves and inverted V-curves of a 3-phase synchronous motor?	2	CO 5	K2	PO4

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

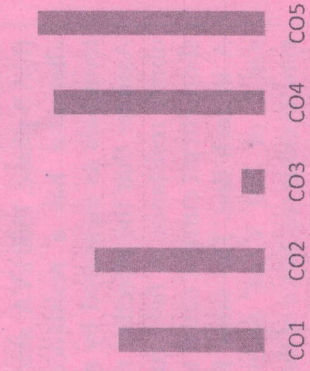
CO1	Recognize different electrical machine.
CO2	Understand the operation of ac machines.
CO3	Apply the concepts of rotating magnetic fields to find characteristics of Induction motor.
CO4	Ability to conduct experiments on Ac Machines to find the Characteristics
CO5	Modify the characteristics of operation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

GRAFICAL REPRESENTATION

Bloom's Level wise Marks Distribution



Course Outcome Wise Marks Distribution



ix	What do you mean by pull-in and pull-out torque in three three-phase synchronous motor?	2	CO 5	K4	PO5
x	Enlist applications of Hysteresis Motor.	2	CO 5	K6	PO6
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 5 Marks)					
Q. No.	QUESTIONS	Marks	C Os	KL	PO
2	Deduce the expression for the frequency of rotor current in an induction motor.	5	CO 1	K3	PO1
3	Why starters are necessary for starting induction motors? Name different starting methods for 3-phase induction motors.	5	CO 2	K1	PO1
4	A 500 V, 6 pole, 50 Hz, 3 phase induction motor develops 20 kW inclusive of mechanical losses when running at 995 r.p.m., the p.f. being 0.87. Calculate (a) the slip, (b) the rotor I ² R loss, (c) the total input if the stator loss is 1500 W, (d) line current, (e) the rotor frequency.	5	CO 5	K4	PO4
5	A 3-phase, 16-pole synchronous generator has a resultant air-gap flux of 0.06 Wb per pole. The flux is distributed sinusoidally over the pole. The stator has 2 slots per pole per phase and 4 conductors per slot are accommodated in two layers. The coil span is 150° electrical. Calculate the phase and line-induced voltage when the machine runs at 375 r.p.m.	5	CO 5	K5	PO2
6	Write down the difference between synchronous and induction motors	5	CO 4	K1	PO5
7	Describe the construction and working of the capacitor-start-capacitor-run single-phase induction motor.	5	CO 4	K6	PO6
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)					
Q. No.	QUESTIONS	Marks	C Os	KL	PO
8	(a) Explain the principle of operation of a three-phase induction motor (b) A 6-pole, 50 Hz, 3-phase induction motor running on full load develops a useful torque of 150 Nm at a	10 [6+4]	CO 1	K3	PO1

9	rotor frequency of 1.5 Hz. Calculate the shaft power output. If the mechanical torque lost in friction be 10 Nm, determine (a) rotor copper loss (b) the input to the motor, and (c) the efficiency Derive the relationship for torque developed by a 3-phase induction motor. Draw a typical torque-slip characteristic and deduce the condition for maximum torque.	10	CO 2	K4	PO4
10	(a) Deduce the expression of the e.m.f equation for an alternator. (b) A 3-phase, 1500 kVA, star-connected, 50 Hz, 2300 V alternator has a resistance between each pair of terminals as measured by a direct current is 0.16 Ω. Assume that the effective resistance is 1.5 times the ohmic resistance. A field current of 70 A produces a short-circuit current equal to full-load current of 376 A in each line. The same field current produces an e.m.f. of 700 V on open circuit. Determine the synchronous reactance of the machine and its full load regulation at 0.8 power factor lagging* Why are synchronous motors not self-starting? What are the common methods for starting synchronous motors? Explain briefly the double-revolving field theory for single-phase induction motors.	10 [4+6]	CO 4	K2	PO4
11	Why are synchronous motors not self-starting? What are the common methods for starting synchronous motors?	10	CO 5	K3	PO5
12	Explain briefly the double-revolving field theory for single-phase induction motors.	10	CO 4	K6	PO6



ARKA JAIN University
Jharkhand



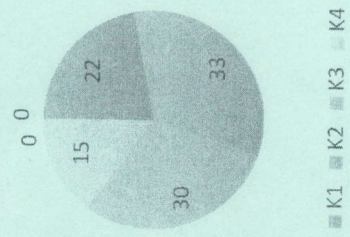
END SEM EXAMINATION
School of Engineering & IT

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

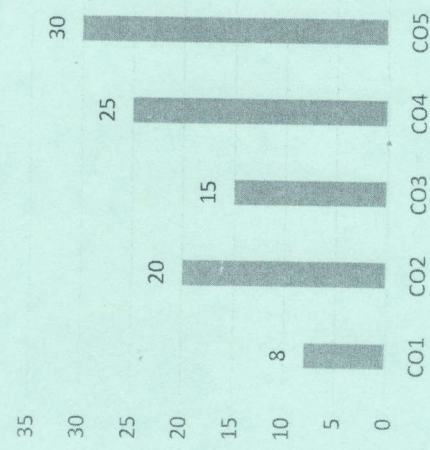
Course Outcomes	CO1	Identify the fundamental concepts and techniques used in digital electronics.
	CO2	Understand the process of Analog to Digital conversion and Digital to Analog conversion.
	CO3	Apply the defined technique to structure various number systems.
	CO4	Examine the structure of various number 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.

GRAFICAL REPRESENTATION

Bloom's Level Wise Marks Distribution



Course Outcomes Wise Marks Distribution



Branch	Electrical and Electronics Engineering	Program	B. Tech
Subject Name	Digital Electronics	Semester	IV
		Year	June 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

Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks					
Q. N1	QUESTIONS	Marks	COs	KL	PO
i	Difference between SOP and POS?	2	CO2	K1	PO2
ii	What are the advantages of the K-Map Method?	2	CO2	K2	PO1
iii	How many types of number systems are there?	2	CO1	K1	PO3
iv	List the types of Flip Flop.	2	CO2	K1	PO2
v	What are the applications of multiplexers?	2	CO1	K1	PO4
vi	Write the characteristics of complementary metal oxide semiconductor (CMOS)?	2	CO1	K2	PO2
vii	What is Gray code?	2	CO2	K1	PO5
viii	State the De Morgan's Theorem.	2	CO2	K1	PO6
ix	What is a Logic gate?	2	CO2	K1	PO12
x	List the properties of Boolean Algebra?	2	CO1	K1	PO11

Section B (Answer any FOUR out of SIX) - 20 Marks

(Each question carry 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Sketch the logic circuit of Full-subtractor.	5	CO2	K5	PO3
3	(i) Convert (725.25) ₈ to its decimal, binary and Hexadecimal equivalent. (ii) Find 1's and 2's Complement of 8 digit binary number 10101101.	5	CO2	K4	PO2
4	Write a brief note on the De Multiplexer.	5	CO3	K4	PO12
5	Explain the following Logic Gates with diagram and Truth Table. i. NAND Gate ii. NOR Gate	5	CO3	K4	PO1
6	Compare the function of decoder and encoder.	5	CO4	K4	PO2
7	Give the comparison between Combinational and Sequential Circuits.	5	CO3	K4	PO1

Section C (Answer any THREE out of FIVE) - 30 Marks-

(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Explain in brief about the Counters.	10	CO5	K3	PO2
9	Describe the functioning a D-Flip Flop with its logical circuit.	10	CO5	K5	PO1
10	List the types of shift register? Explain any one of them	10	CO4	K6	PO2
11	What is programmable logic array? How it differs from ROM?	10	CO4	K2	PO1
12	Write short notes on analog to digital converter.	10	CO5	K3	PO2
					PO3



**ARKA JAIN
University**
Jharkhand



END SEM EXAMINATION
School of Engineering & IT

Branch	Electrical & Electronics Engineering	Program	B.TECH
Subject Name	Essences of Indian Knowledge & Tradition	Semester	IV
		Year	June 2024
Time: 1.5 Hour Max. Marks : 35	<ul style="list-style-type: none"> 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 Five out of Six of Section B Answer Any Four 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 come 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 01 Mark from Q1-i to v) – 05 Marks

Q. N1	QUESTIONS	Marks	COs	KL
i	Define Indian Knowledge System.	01	CO1	KL1
ii	How many hymns are there in Rig Veda?	01	CO1	KL1
iii	In which Veda, the term Statecraft is mentioned.	01	CO2	KL2
iv	Yajur Veda in Sanskrit is also known as.....	01	CO2	KL2
v	Write another name of Black Yajur.	01	CO3	KL3

Section B (Answer any FIVE out of SIX) – 10 Marks
(Each question Carry 02 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Write any two teachings of Rig Veda.	02	CO1	KL5
3	Give any two characteristics of Indian Knowledge System.	02	CO3	KL6
4	Explain the term Indigenous Community.	02	CO3	KL2
5	Name and explain briefly any two Vedas.	02	CO2	KL1
6	Write the natural elements associated with basic sense: sound/hear and touch.	02	CO3	KL1
7	Explain Sthapatya Veda.	02	CO2	KL3

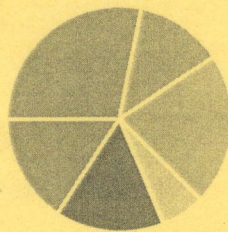
Section C (Answer any Four out of FIVE) – 20Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the term Yoga and its importance.	05	CO3	KL1
9	Write the brief introduction of Atharv Veda.	05	CO2	KL2
10	What do you mean by the word Upangas. Name all the Upangas.	05	CO2	KL5
11	What is Jyostha and Niruktam.	05	CO4	KL6
12	Give a brief introduction of Yajur Veda.	05	CO3	KL3

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.

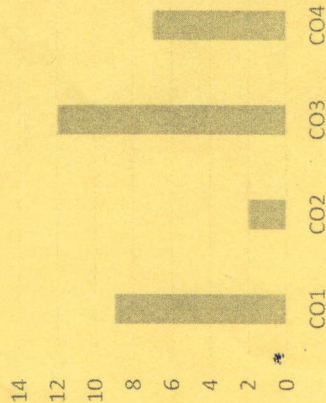
GRAFICAL REPRESENTATION

Bloom's Level Wise Marks Distribution



■ KL1 ■ KL2 ■ KL3 ■ KL4 ■ KL5 ■ KL6

Course Outcome Wise Marks Distribution



28/6/24 60

ARKA JAIN University
Jharkhand



END SEM EXAMINATION
School of Engineering & IT

Branch: Electrical and Electronics Engineering
Subject Name: Signals & Systems
Program: B. Tech
Semester: IV
Year: June 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

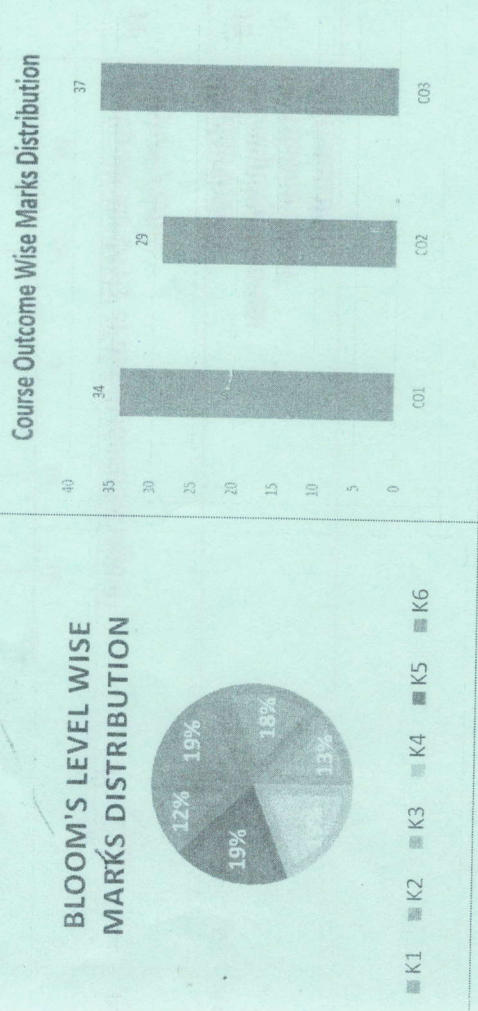
Section A (Each question Carry 02 Marks from Q1-i to Q1-x) - 20 Marks

Q. N	QUESTIONS	Marks	Cos	KL	PO
1					
i	Enumerate the significance of the Fourier series.	2	CO1	K2	PO1
ii	Give the expression for Fourier transform and inverse Fourier transform.	2	CO3	K5	PO2
iii	Explain the usefulness of the Z-transform.	2	CO2	K5	PO2
iv	Represent the sequence $y(n) = (-1)^n u(n)$, where n varies from 0 to ∞ .	2	CO3	K5	PO2
V	What is the time-scaling property of signals?	2	CO2	K6	PO1
vi	Explain with an example, the time-reversal property.	2	CO2	K2	PO1
vii	What is Nyquist rate?	2	CO2	K6	PO1
viii	Define the term aliasing.	2	CO2	K4	PO1
ix	Write the mathematical equation for the unit step function.	2	CO1	K5	PO2
x	State any two property of a LTI system.	2	CO3	K4	PO1

KL- Knowledge Level, PO - Program Outcome

- Course Outcomes:
- CO1 Understand the concepts of continuous time and discrete time systems.
 - CO2 Understand sampling theorem and its implications.
 - CO3 Analyze systems in complex frequency domain.

GRAPHICAL REPRESENTATION



Section B (Answer any FOUR out of SIX) - 20 Marks

(Each question 5 Marks)

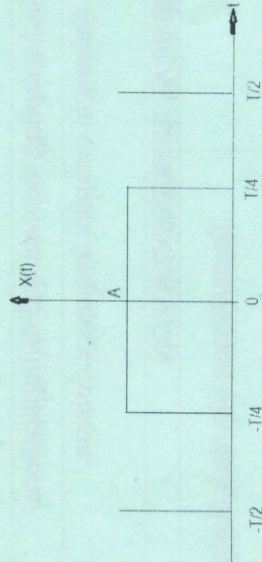
Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	Sketch a discrete time signal $x(n) = 2^{-n}$ for $-2 \leq n \leq 2$ and obtain. i. $y_1(n) = 2x(n) + \delta(n)$ ii. $y_2(n) = x(n)u(2-n)$	5	CO1	K6	PO1
3	Find the Z- Transform of $x(n) = a^n u(n-1)$. Also find the region of convergence (ROC) of the signal	5	CO3	K5	PO2
4	Find the convolution of the signal $x(n) = (2, 1, 1, 1, 3)$ where impulse response of the signal is $h(n) = (2, 2, 3, 4)$	5	CO3	K3	PO2
5	Determine the Z-transform of any two of the following finite duration signals. a) $x(n) = \{1, 2, 4, 7, 0, 1, 2\}$ \uparrow b) $x(n) = \{2, 3, 1, 4, 0, 1\}$	5	CO2	K4	PO2
6	Discuss the properties of the Fourier series.	5	CO3	K1	PO1
7	Define briefly: a) Even and odd signal b) Deterministic and random signal	5	CO2	K2	PO1

Section C (Answer any THREE out of FIVE) - 30 Marks-

(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	Cos	KL	PO
8	Explain the following standard signals with mathematical expression and graphical representation: a) unit step signal b) Signum function c) Exponential signal d) Unit ramp signal	10	CO1	K1	PO1
9	Find whether following signals are periodic or not. If yes then find the period. $x(n) = \cos(\lfloor n/5 \rfloor) \sin(\lfloor n/5 \rfloor)$ $x(n) = \cos(n/5) \cos(\lfloor n/5 \rfloor)$ $x(k) = \sum_{k=-\infty}^{\infty} (-1)^k \delta(t - 2k)$	10	CO1	K2	PO1

Obtain the Fourier series representation of the given periodic rectangular waveform.



Compute the DTFT of the exponential signal

$$x(n) = e^{j\pi n} / 4u(n).$$

Explain briefly:

- a) Sampling Theorem
- b) Aliasing Effect
- c) Modulation

10

CO3

K4

PO2

11

CO3

K4

PO2

12

CO3

K5

PO2