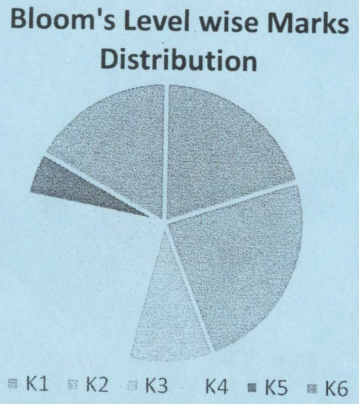
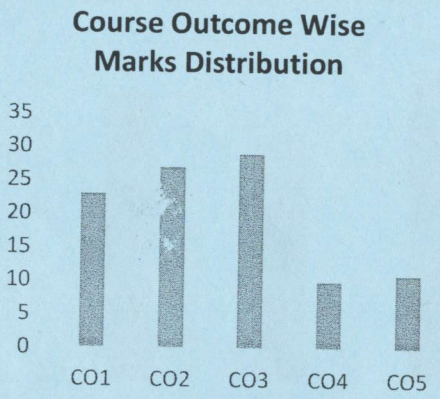
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Review the fundamental concepts of a digital image processing system
	CO2	Analyze images in the frequency domain using various transforms.
	CO3	Evaluate the techniques for image enhancement and image restoration.
	CO4	Categorize various compression techniques.

GRAPHICAL REPRESENTATION





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ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	**Computer Science Engineering**	**Program**	**B.Tech**
Subject Name	**Image Processing**	**Semester**	**V**
		Year	**Odd Nov/Dec 2023**

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 comes 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. No 1	QUESTIONS	Marks	COs	KL	PO
i	What is meant by illumination and reflectance?	2	CO1	K1	PO1
ii	Define subjective brightness and brightness adaptation?	2	CO1	K1	PO1
iii	Write the expression to find the number of bits to store a digital image?	2	CO5	K2	PO4
iv	What is meant by path?	2	CO2	K1	PO4
v	What is Image Transform?	2	CO3	K4	PO2
vi	What is geometric transformation?	2	CO1	K2	PO1
vii	Give the formula for calculating D4 and D8 distance.	2	CO1	K1	PO1
viii	Give the Conditions for perfect transform	2	CO5	K1	PO1
ix	Explain the basic Elements of digital image processing.	2	CO5	K6	PO4
x	What are the applications of transform?	2	CO3	K4	PO2

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Describe the fundamental steps in image processing?	5	CO1	K2	PO1
3	Describe the basic relationship between the pixels.	5	CO4	K4	PO2
4	Specify the properties of 2D Fourier transform.	5	CO5	K6	PO5
5	Explain CMY model.	5	CO4	K4	PO5
`6	Write the properties of Singular value Decomposition(SVD)?	5	CO2	K2	PO2
7	Describe the HSI colour image model?	5	CO3	K5	PO5

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	What are the steps for Filtering in the Frequency Domain?	10	CO2	K1	PO1
9	Given below is a 3 * 3 image. What will be the value of the center pixel change when this image is passed through an Arithmetic mean filter 7 | 5 (ii) Geometric mean filter 3 (iii) Harmonic mean filter (iv) Max-filter (v) Min-filter.	10	CO2	K6	PO5
10	Consider a 3×3 spatial mask that averages the four closest neighbours of a point (x, y) , but excludes the point itself from the average. a) Write an expression for the filter, h(x, y) , in the spatial domain. b) Show that the equivalent filter, H(u, v) , in the frequency domain is given by $H(u, v) = 1 [\cos(2\pi u/Ncols) + \cos(2\pi v/Nrows)]$	10	CO3	K3	PO1
11	Consider the given 3-bit image what will be new value of the pixel if it's done using 3x3 filters as mention below. a) Correlation filter. b) Convolution filter. c) Weighted average filter (n Geometric mean filter. (a Harmonic mean filter. 5 2 3 7 3 4 1 4 2 1 6 2 1 5 4 2 1 7 2 3 3 5 1 6 4	10	CO1	K2	PO4
12	Describe Fast Fourier Transform	10	CO3	K4	PO2

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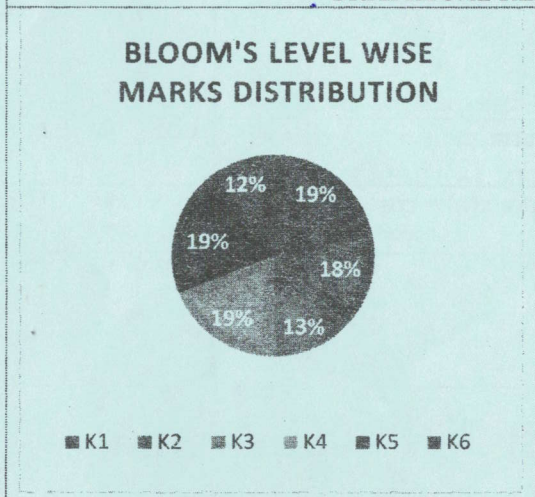
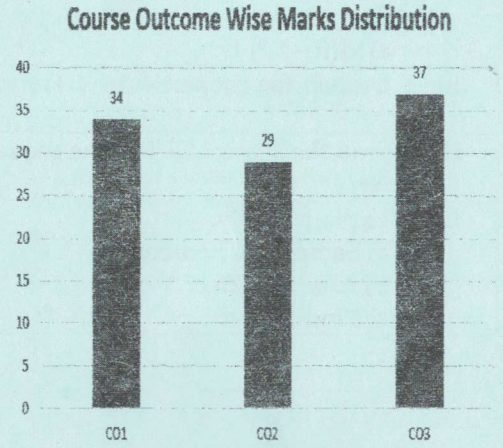
CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

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





ARKAJAIN University Jharkhand

END SEM EXAMINATION
School of Engineering & IT

Branch	Computer Science & Engineering	Program	B.Tech
Subject Name	Signals & Systems	Semester	V
		Year	Odd Nov/Dec 2023

Time: 3 Hour
Max. Marks : 70

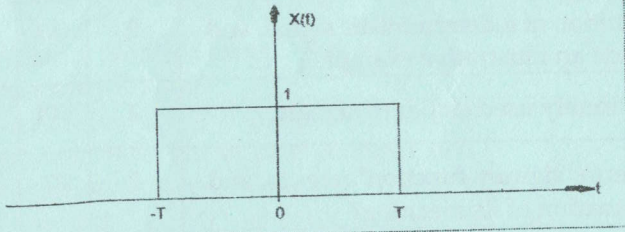
- Start writing from 2nd page onwards; don't Write on the 1st Page Backside
- Answer all Questions of Section A (Compulsory)
- Answer Any Four out of Six of Section B
- Answer Any Three out of Five of Section C
- Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes 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 1	QUESTIONS	Marks	Cos	KL	PO
i	What is the definition of a deterministic signal, and could you provide an illustrative example?	2	CO1	K1	PO1
ii	Enlist some commonly used standard signals.	2	CO1	K1	PO1
iii	What does the term "signum function" refer to, and provide an explanation of its meaning?	2	CO1	K1	PO1
iv	What are the conditions that must be met for a signal to be considered periodic?	2	CO1	K3	PO1
V	What purpose does Fourier transformation serve	2	CO2	K4	PO2
vi	Explain the concept of an even signal?	2	CO1	K2	PO1
vii	Represent the sequence $x(n) = 2^n u(n)$. where n varies from 0 to ∞.	2	CO1	K3	PO2
viii	What does LTI system stand for, and provide an explanation of its meaning?	2	CO3	K1	PO1
ix	Give the conditions that determine the stability of a signal	2	CO1	K2	PO2
x	What is the definition of the term "aliasing"?	2	CO2	K4	PO1

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

Q. No.	QUESTIONS	Marks	Cos	KL	PO
2	With a mathematical expression and graphical representation explain symmetrical and anti-symmetrical signal.	5	CO1	K3	PO1
3	If $X1(n) = 2\delta(n-1) + 3\delta(n) + \delta(n+1)$ $X2(n) = \delta(n-1) + 4\delta(n) + 2\delta(n+1)$. Determine X(n) by any method, where X(n) is the convolution of X1(n) and X2(n).	5	CO3	K5	PO2
4	Determine the Z-transform of the following finite duration signals. a) $x(n) = \{3, 1, 2, 5, 7, 0, 1\}$ ↑ b) $x(n) = \{0, 0, 1, 2, 5, 4, 0, 1\}$	5	CO2	K4	PO2
5	Obtain the Fourier transform of a rectangular varying from –T to T with amplitude of 1. 	5	CO3	K6	PO2
6	Define briefly: a) Causal and non-causal signal b) Periodic and non-periodic signal	5	CO1	K1	PO1
7	Solve the following integral: a) $\int_{-\infty}^{\infty}[t^2+1]\delta(t)dt$ b) $\int_{-1}^{2}[t^4+1]\delta(t-1)dt$	5	CO1	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 impulse function b) Sinc Function c) Rectangular Function	10	CO1	K1	PO1
9	A discrete time signal is given below as, $X(n) = (-0.5, 0.5, 1, 1, 1, 1, 0.5,)$ ↑ Sketch the following in reference to the above signal: a) x(n - 3) b) x(3 - n) c) x(2n) d) x(n)u(3-n) e) $x[(n-1)^2]$	10	CO3	K3	PO2
10	Discuss the properties of Z Transform	10	CO2	K6	PO1
11	Find the 4-point DFT of the sequence $x(n) = \cos n\pi/4$	10	CO3	K5	PO2
12	Explain briefly: a) Sampling Theorem b) Aliasing Effect c) Modulation	10	CO2	K2	PO1

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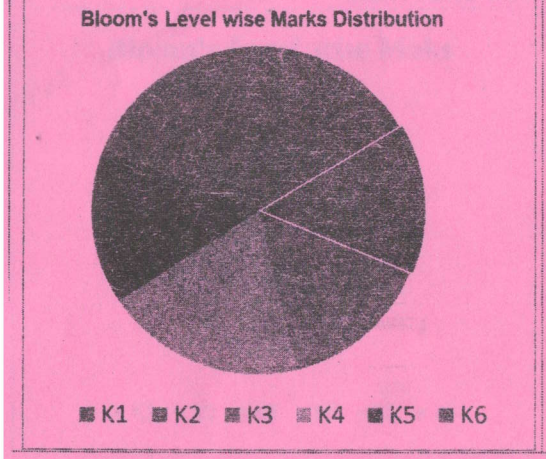
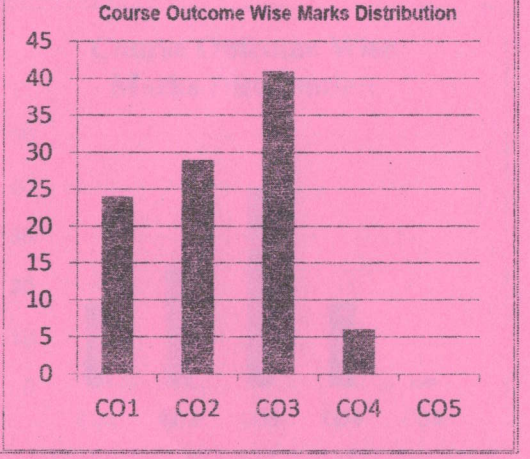
CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

Course Outcomes	CO1	Specify simple abstract data types and design implementations, using abstraction Functions to document them
	CO2	Recognize features of object-oriented design such as encapsulation, polymorphism,inheritance,andcompositionofsystemsbasedonobject identity
	CO3	Name and apply some common object-oriented design patterns and give Examples of their use.
	CO4	Design applications with an event-driven graphical user interface

GRAPHICAL REPRESENTATION





JGI ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	Computer Science & Engineering	Program	B.Tech
Subject Name	Object Oriented Programming	Semester	V
		Year	Odd Nov/Dec 2023

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 comes 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 1	QUESTIONS	Marks	COs	KL	PO
i	What is interface & when do we use it?	2	CO1	K1	PO2
ii	What is Multithreading ?	2	CO2	K1	PO3
iii	How we can invoke base class constructor ?	2	CO2	K4	PO3
iv	What is Abstract classes ?	2	CO1	K1	PO2
v	What is interface and How we can create and use the interfaces ?	2	CO3	K1	PO3
vi	What is package and How we can use it ?	2	CO2	K2	PO3
vii	What are Checked exceptions and unChecked exceptions ?	2	CO1	K3	PO2
viii	What is thread deadlock ?	2	CO1	K3	PO2
ix	What are the JDBC API components ?	2	CO4	K2	PO5
x	What is a container in a GUI?	2	CO2	K4	PO3

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Write a program to illustrate the use of calling base class methods in derived class .	5	CO2	K6	PO3
3	Differentiate between class and package.	5	CO3	K2	PO3
4	Write a program to check a string is palindrome or not without using library functions.	5	CO1	K5	PO2
5	What are the different access specifiers available in java? Name any three non-primitive data types in java.	5	CO1	K1	PO2
6	What is the Significance of layout manager ?	5	CO2	K3	PO3
7	What is OOP? Explain any 3 important features of OOP.	5	CO3	K1	PO3

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

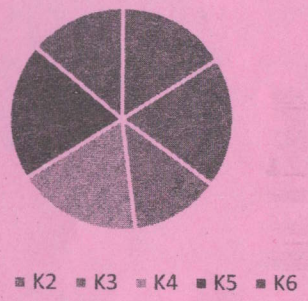
Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Write notes on: try, catch, throws, finally	10	CO3	K1	PO3
9	Two strings are called anagrams if they contain same set of characters but in different order. Write a program in Java to check the strings are anagrams or NOT ?	10	CO3	K3	PO3
10	Please write a program to reverse the linked list in Java ?	10	CO1	K5	PO2
11	Write a program to Copy Content From One File to Another File in Java.	10	CO2	K4	PO3
12	Write a simple Java Swing program of displaying image on the button?	10	CO2	K5	PO3

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

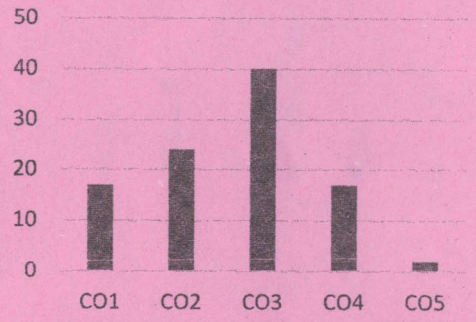
Course Outcomes	CO1	have a broad understanding of database concepts and database management system software
	CO2	have a high-level understanding of major DBMS components and their function
	CO3	be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
	CO4	be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
	CO5	be able to program a data-intensive application using DBMS APIs.

GRAFICAL REPRESENTATION

Bloom's Level wise Maks Distrbution



Course Outcome Wise Marks Distribution



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3

ARKAJAIN University Jharkhand

END SEM EXAMINATION
School of Engineering & IT

Branch	**Computer Science and Engineering**	**Program**	**B.Tech**
Subject Name	**Database Management System**	**Semester**	**V**
		Year	**Odd Nov/Dec 2023**

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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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 1	QUESTIONS	Marks	COs	KL	PO
i	Define Database Management System.	2	CO3	K1	PO2
ii	Differentiate between Database, Database management system, relational database management system.	2	CO2	K1	PO3
iii	Define candidate key.	2	CO3	K2	PO1
iv	Define Super Key.	2	CO3	K2	PO2
v	Define Primary Key.	2	CO2	K3	PO2
vi	Define Foreign Key.	2	CO4	K3	PO4
vii	Define Relationship.	2	CO3	K4	PO5
viii	Define the one advantage and disadvantage of DBMS.	2	CO1	K5	PO1
ix	Define DDL and DML in DBMS.	2	CO3	K2	PO2
x	Define normalization.	2	CO5	K6	PO4

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Define DBMS with its architecture.	5	CO1	K2	PO1
3	Explain Entity-Relationship Model.	5	CO2	K2	PO3
4	What is the use of group by clause?	5	CO3	K3	PO4
5	Define database 2 advantages and 2 disadvantages.	5	CO2	K3	PO2
6	Explain select, from and where operation of an SQL with example.	5	CO4	K4	PO5
7	Differentiate between prime and non-prime attribute with proper example.	5	CO3	K4	PO6

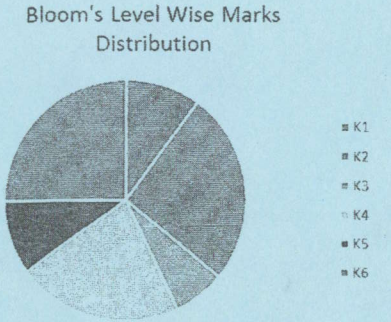
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

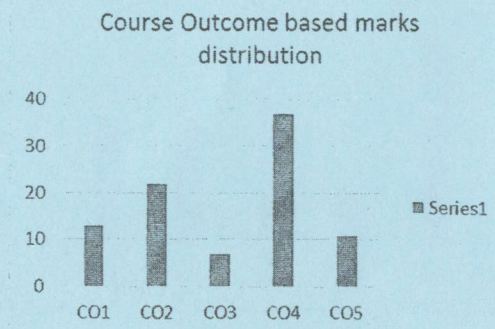
Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Explain in detail about various key constraints used in database system	10	CO3	K2	PO3
9	State BCNF. How does it differ from 3NF?	10	CO2	K3	PO2
10	State 1NF, 2NF & 3NF and explain with examples.	10	CO1	K4	P01
11	Write a short notes on i) Foreign Key ii) Relation state iii) Database schema.	10	CO4	K3	PO4
12	Why the concurrency control is needed? Explain it.	10	CO3	K4	PO3

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

Course Outcomes	CO1	Write a formal notation for strings, languages and machines.
	CO2	Design finite automata to accept a set of strings of a language
	CO3	For a given language determine whether the given language is regular or not.
	CO4	Design context free grammars to generate strings of context free language
	CO5	Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars

GRAFICAL REPRESENTATION





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ARKAJAIN University Jharkhand

END SEM EXAMINATION
School of Engineering & IT

Branch	**Computer Science & Engineering**	**Program**	**B. Tech**
Subject Name	**Formal Language & Automata Theory**	**Semester**	**V**
		Year	**Odd Nov/Dec 2023**

Time: 3 Hour
Max. Marks : 70

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
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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 1	QUESTIONS	Marks	COs	KL	PO
i	Define Finite Automata.	2	CO1	K1	PO2
ii	Define Ambiguous Grammar with example.	2	CO2	K1	PO3
iii	What is Context sensitive grammar?	2	CO3	K2	PO1
iv	Design the structure of Push Down automata.	2	CO5	K3	PO2
v	Give any two differences between NFA and DFA.	2	CO1	K1	PO2
vi	What are the Chomsky classification of grammars?	2	CO5	K4	PO2
vii	Give an example of power set.	2	CO1	K2	PO2
viii	Define Null production in Context free grammar.	2	CO4	K1	PO3
ix	What is the difference between L^* and L^+?	2	CO1	K2	PO2
x	Define Turing Machine.	2	CO5	K1	PO2

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Design a Deterministic finite automata over {0,1} which accepts string '11'.	5	CO1	K2	PO2
3	Explain unit production? Explain the procedure to eliminate unit production.	5	CO3	K3	PO3
4	Differentiate between leftmost and rightmost derivation.	5	CO5	K4	PO3
5	How does Griebach normal form differs from Chomsky normal form?	5	CO4	K4	PO3
6	Write differences between Mealy Machine and Moore machine.	5	CO2	K2	PO3
7	Construct NFA for (0 + 1)*(00 + 11)(0 + 1)* and Convert to DFA.	5	CO2	K6	PO3

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Write down the steps for simplification of Context free grammar.	10	CO4	K2	PO3
9	Draw the transition diagram and table for the Deterministic Finite Automata over {0,1} which accepts all strings with substring '01'.	10	CO2	K5	PO3
10	S→ ASA | aB A→ b|S B→ b | ε Convert the following Context Free Grammar into Chomsky Normal Form.	10	CO4	K4	PO3
11	T→ aaB|abA|aaT A→ aA B→ ab|b C→ ad Simplify the above Context Grammar by eliminating useless symbol and write the reduce grammar.	10	CO2	K6	PO3
12	Construct Transition diagram for Turing Machine: - L={0n 1n 0n /n>=1}	10	CO4	K6	PO3

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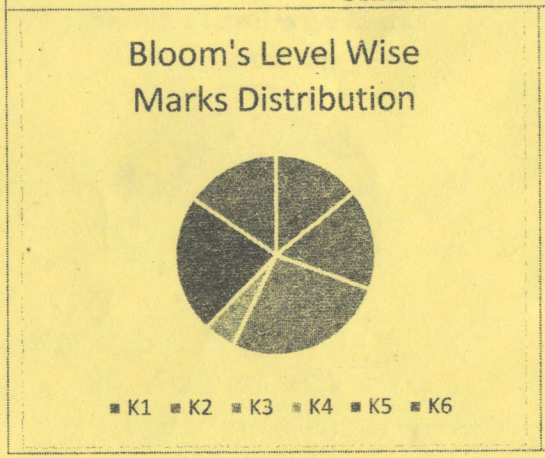
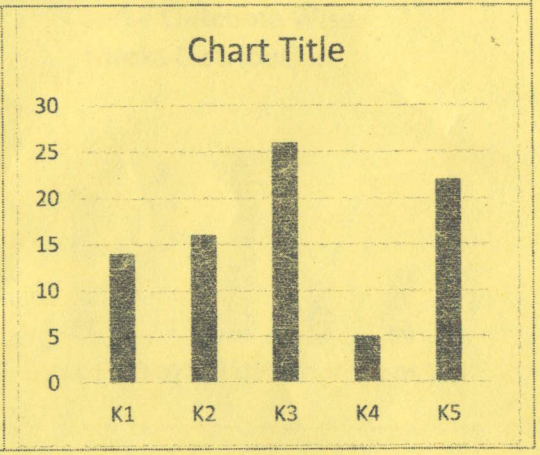
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	State the Corporate communication culture.
	CO2	Implement Corporate Social Responsibility and Ethics.
	CO3	Acquire corporate email, mobile and telephone etiquette.
	CO4	Judge presentation and entrepreneurial skills of individuals.
	CO5	Develop business reports and proposals expected of a corporate professional.

GRAFICAL REPRESENTATION





ARKAJAIN University Jharkhand

END SEM EXAMINATION
School of Engineering & IT

Branch	Computer Science Engineering	Program	B.Tech
Subject Name	Soft Skills and Interpersonal Communication	Semester	V
		Year	Odd Nov/Dec 2023

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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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 1	QUESTIONS	Marks	COs	KL	PO
i	Fill in the correct Verb: You ..... (has/have made) your shirt dirty.	2	CO1	K1	PO2
ii	Fill in the correct Verb: Nobody..... (know/knows) when he will arrive.	2	CO1	K1	PO3
iii	Write the synonym and antonym of the word: gigantic.	2	CO2	K2	PO4
iv	Write the synonym and antonym of the word: parched.	2	CO2	K2	PO5
v	Write the meaning of the homonyms: fair and fare.	2	CO3	K2	PO7
vi	What do you mean by the term self- esteem?	2	CO4	K3	PO9
vii	What is the meaning of the term Communication skills?	2	CO5	K3	PO8
viii	How many styles of Leadership are there?	2	CO3	K5	PO2
ix	Write two importance of good Leadership qualities.	2	CO4	K5	PO1
x	Give two parameters of Group Discussion evaluation.	2	CO1	K3	Po2

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

No.	QUESTIONS	Marks	COs	KL	PO
2	Give the meaning of and write one sentence with the business idiom: the big picture.	5	CO1	K3	PO2
3	How important are Words in the Art of Communication.	5	CO3	K4	PO3
4	Name the steps in process of communication.	5	CO2	K3	PO5
5	Name 4 important Social Media Etiquettes.	5	CO4	K5	PO4
6	What is forming in Team Formation?	5	CO4	K5	PO5
7	Give the meaning of and write one sentence with the business idiom : to cut corners.	5	CO5	K6	PO6

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

No.	QUESTIONS	Marks	COs	KL	PO
8	Using the describing words, describe a Visit to Hill Station in your own words.	10	CO3	K1	PO1
9	What are the elements of team work?	10	CO2	K2	PO2
10	Explain the different types of Communication.	10	CO2	K5	PO3
11	What is Interpersonal Communication?	10	CO4	K6	PO7
12	Write down the stages of Team Formation.	10	CO5	K3	PO8