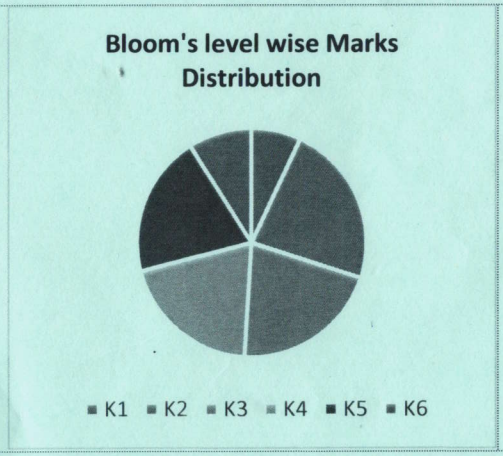
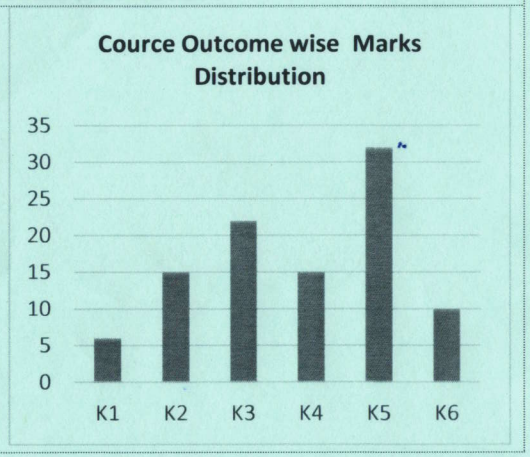
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	The mathematical tools needed in evaluating multiple integrals and their usage.
	CO2	The effective mathematical tools for the solutions of differential equations that model physical processes.
	CO3	The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems
	CO4	An ability to apply effective, creative and innovative solutions, both independently and cooperatively, to current and future problems.
	CO5	A commitment to continuing learning and the capacity to maintain intellectual curiosity.
	CO6	An ability to develop statistical technique, data sampling.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A

[17-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**EEE /ME/CSE /AIDS(IBM)/AIML**	**Branch**	**B. Tech**
Subject Name	**Engineering Mathematics-III**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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 1	QUESTIONS	Marks	COs	KL
i	If $u_0 = 3$, $u_1 = 12$, $u_2 = 18$, $u_3 = 2000$, $u_4 = 100$, calculate Δu_0.	2	CO3	K1
ii	Write the relation between Mean, Median and Mode.	2	CO1	K2
iii	Write the Lagrange's Interpolation formula.	2	CO2	K2
iv	Write the formula for numerical differentiation.	2	CO1	K2
v	Find the variance for the data given : X: 0 1 2 3 $p(x)$: $\frac{1}{8}$ $\frac{3}{8}$ $\frac{3}{8}$ $\frac{1}{8}$	2	CO5	K1
vi	Define sample in sampling theory.	2	CO3	K5
vii	Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even?	2	CO2	K1
viii	Determine which numerical method is best suited for solving nonlinear equations with rapid convergence, and justify your choice.	2	CO1	K2

ix	Define Random Variable with an example.	2	CO3	K2
x	If the value of mode is 25.5 and median is 16.5 then find mean?	2	CO1	K3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Find the real root of the equation x^3 - 4x -9= 0 using Bisection Method.	05	CO2	K5
3	A random variable X has the following probability function X: 0 1 2 3 4 5 6 7 P(x): 0 k 2k 2k 3k K^2 $2K^2$ $7K^2+k$ Find (i) value of k (ii) Evaluate P(X<6)	05	CO2	K5
4	Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by Simpson's 1/3 rule.	05	CO2	K3
5	Find the value of Y when X= 10, by Lagrange's interpolation formula x: 5 6 9 11 y: 12 13 14 16	05	CO1	K3
6	Find u_9 if $u_0 = 14, u_4 = 24, u_8 = 32, u_{12} = 35, u_{16} = 40$, using Gauss forward formula	05	CO1	K4
7	Find mean and variance: x={ 1,2,3,4,5,6} ; x= no. of appears on the die X: 0 1 2 3 4 5 6 p(x): 0 $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$	05	CO2	K2

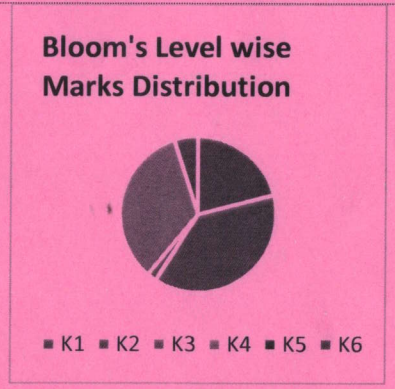
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

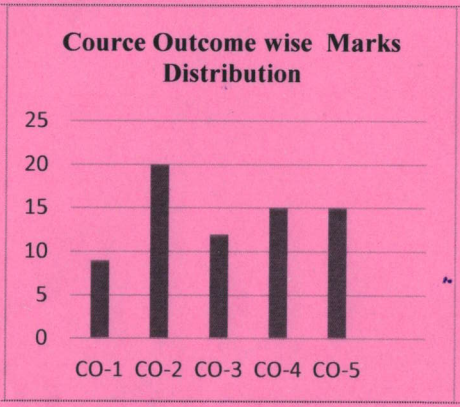
Q. No.	QUESTIONS	Marks	COs	KL
8	Evaluate $\int_0^6 x \sec x \, dx$ using 8 intervals by Trapezoidal rule.	10	CO1	K4
9	If X is a continuous random variable with the p.d.f $f(x)=\begin{cases} a(2x-x^2), & 0 \le x \le 2 \\ 0, & otherwise \end{cases}$ Find (i) a (ii) p(x>1).	10	CO3	K5
10	Fit a straight line for the following data by least square method X: 1 2 3 4 6 8 Y: 2.4 3 3.6 4 5 6	10	CO6	K6
11	Find the value of y for x=0.1 by Picard's method. Given that $\frac{dy}{dx} = \frac{y-x}{y+x}$; y(0) =1.	10	CO3	K3
12	Find the real root of the equation x^3 - 3x - 5= 0 by Newtons-Raphson method	10	CO2	K5

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

Course Outcomes	CO1	Understand basic gender concepts and socialization processes.
	CO2	Analyze different types of gender roles and relationships.
	CO3	Evaluate the division and valuation of labour in gender contexts.
	CO4	Analyze types and consequences of gender-based violence.
	CO5	Analyze gender representation in media and culture.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	[20-01-2026] END SEM EXAMINATION School of Engineering & IT	
Program	EEE / ME / CSE / AIML / AIDS	Branch	B. Tech
Subject Name	Gender Sensitization	Session	Odd, 2025-26
Semester	III	Year	Jan, 2026
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 **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 01 Marks from Q1-i to v) – 05 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	Which document allows third gender identity on official records in India? a) Driving license b) Aadhar Card c) Passport d) All of the above	01	CO1	KL1
ii	Lack of awareness about the third gender leads to: a) Equality b) Acceptance c) Discrimination d) Empowerment	01	CO2	KL4
iii	What does gender sensitization primarily aim to achieve? a) Promote one gender over another b) Create awareness and change attitudes towards gender equality c) Encourage traditional gender roles d) Limit participation of women in workplaces.	01	CO1	KL2
iv	Media can support third gender equality by: a) Spreading myths b) Showing negative images c) Promoting positive representation	01	CO3	KL5

	d) Avoiding the topic			
v	Which area is most affected by inequality faced by the third gender? a) Entertainment b) Education and employment c) Sports d) Tourism	01	CO1	KL3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Define Gender.	02	CO1	KL2
3	Stereotype means?	02	CO2	KL1
4	Which legislation in India focuses on preventing sexual harassment at the workplace?	02	CO3	KL3
5	State down the meaning of Patriarchy.	02	CO3	KL2
6	What is sexual harassment?	02	CO2	KL5
7	Mention any two **rights of women** in India.	02	CO3	KL4

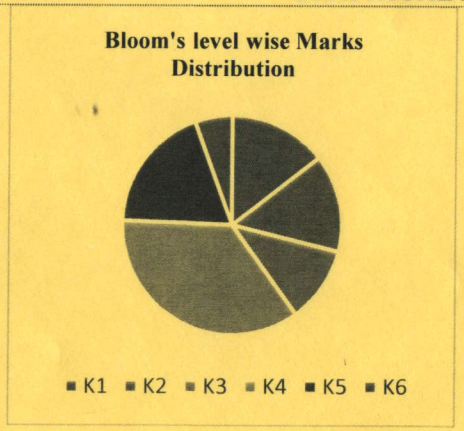
Section C (Answer any TWO out of FOUR) – 20Marks
(Each question Carry 10 Marks)

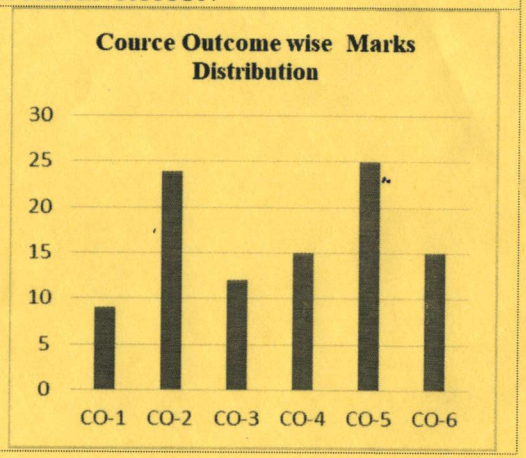
Q. No.	QUESTIONS	Marks	COs	KL
8	Briefly explain about the "Gender Sensitization".	10	CO2	KL2
9	Explain any 5 Equal rights.	10	CO1	KL5
10	Differentiate between the following: EQUALITY AND INEQUALITY	10	CO2	KL5
11	Explain in details – WOMANHOOD AND MANHOOD.	10	CO3	KL3

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

Course Outcomes	CO1	Understand the concepts of digital electronics.
	CO2	Formulate and solve problems related to combinational and sequential circuits.
	CO3	Apply the concept of digital electronics in circuit design.
	CO4	Analyze and test digital circuits.
	CO5	Correlate the concepts of one module to the concepts in other modules.
	CO6	Analyze the working principles and design of digital converters.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand	NAAC GRADE A	[22-01-2026] END SEM EXAMINATION School of Engineering & IT	
Program	CSE / AIDS(IBM) / AIML	**Branch**	B. Tech
Subject Name	Digital Electronics	**Session**	Odd, 2025-26
Semester	III	**Year**	Jan, 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 1	QUESTIONS	Marks	COs	KL
i	Differentiate between volatile and non-volatile binary storage.	2	CO1	K1
ii	Define Boolean Algebra	2	CO2	K2
iii	What are don't-care conditions?	2	CO2	K1
iv	What is the difference between Multiplexer and De multiplexer?	2	CO3	K3
v	Apply De-Morgan's theorem to **((A + B)′ (C + D)) ′.**	2	CO1	K3
vi	Differentiate between Encoder & Decoder.	2	CO2	K1
vii	How do sequential circuits differ from combinational circuits?	2	CO2	K1
viii	Reduce the expression (X + Y′) (X + Y + Z).	2	CO1	K4
ix	What is memory decoding?	2	CO4	K1
x	Prove the expression: A + A'B = A + B	2	CO4	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Given Y (W, X, Y, Z) = ∑m (2, 4, 6, 9, 10, 12, 14), draw the K-map and obtain the simplified expression.	05	CO3	K5
3	Design a logic circuit for F (A, B, C) = Π (0, 2, 3, 4) using NOR gates only.	05	CO2	K2
4	Define counters and classify them with proper explanation & circuit diagram.	05	CO2	K1
5	Implement a full adder using two half adders and OR gate.	05	CO2	K6
6	Explain the architecture and implementation of a Programmable Logic Array (PLA).	05	CO4	K6
7	Design a 4 bit synchronous counter using T flip-flops.	05	CO1	K6

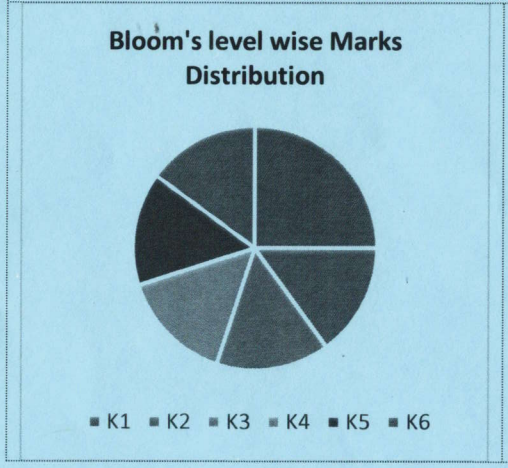
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

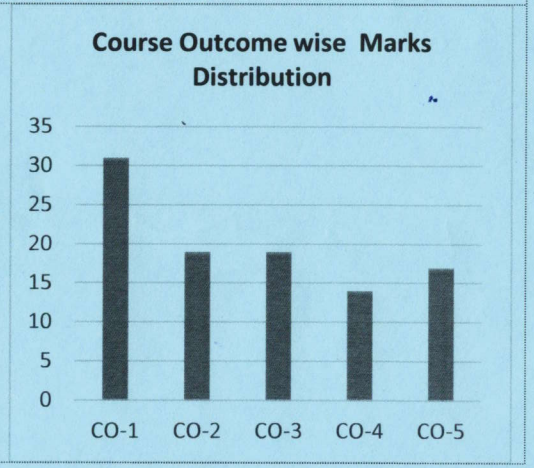
Q. No.	QUESTIONS	Marks	COs	KL
8	Draw and explain the working of all logic gates: AND, OR, NOT, NAND, NOR, XOR, XNOR.	10	CO2	K4
9	Minimize the function F (W, X, Y, Z) = Σ (1, 3, 7, 11, 15) using a K-map and implement it using NAND gates only.	10	CO1	K5
10	Design a 3-to-8 line decoder and explain the logic diagram and truth table.	10	CO2	K6
11	Explain the working principle of an Analog to Digital Converter (ADC) with a suitable diagram.	10	CO4	K3
12	Design a 4-bit shift register and explain the working of different types: SIPO, PISO, SISO, and PIPO.	10	CO2	K6

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

Course Outcomes	CO1	Demonstrate the behaviour of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
	CO2	Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords.
	CO3	Use multithreading concepts to develop inter process communication.
	CO4	Understand the process of graphical user interface design and implementation using AWT or swings.
	CO5	Develop applets that interact abundantly with the client environment and deploy on the server.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand | NAAC GRADE A ACCREDITED UNIVERSITY

[28-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**AIDS (IBM)**	**Branch**	**B. Tech**
Subject Name	**Programming with Java**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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 1	QUESTIONS	Marks	COs	KL
i	Define Byte code in Java?	2	CO1	K1
ii	Explain a constructor in Java?	2	CO1	K1
iii	Define garbage collection in Java?	2	CO1	K1
iv	Define inheritance in Java?	2	CO2	K1
v	Explain the use of extends keyword?	2	CO2	K1
vi	Describe multithreading in Java?	2	CO3	K1
vii	What is inter-thread communication?	2	CO3	K1
viii	Define AWT in Java?	2	CO4	K1
ix	What is Swing in Java?	2	CO4	K1
x	Describe an Applet?	2	CO5	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Write a program to check whether a string is palindrome or not without using library functions.	5	CO1	K3
3	Write a program to convert a string into (a) character array and (b) byte array in Java.	5	CO1	K4
4	Differentiate between method overloading and method overriding with examples.	5	CO1	K2
5	Explain the life cycle of a thread with a neat diagram.	5	CO3	K1
6	Write an applet code to show any three geometrical shapes.	5	CO5	K5
7	Write a Java code to demonstrate the use of an interface.	5	CO2	K6

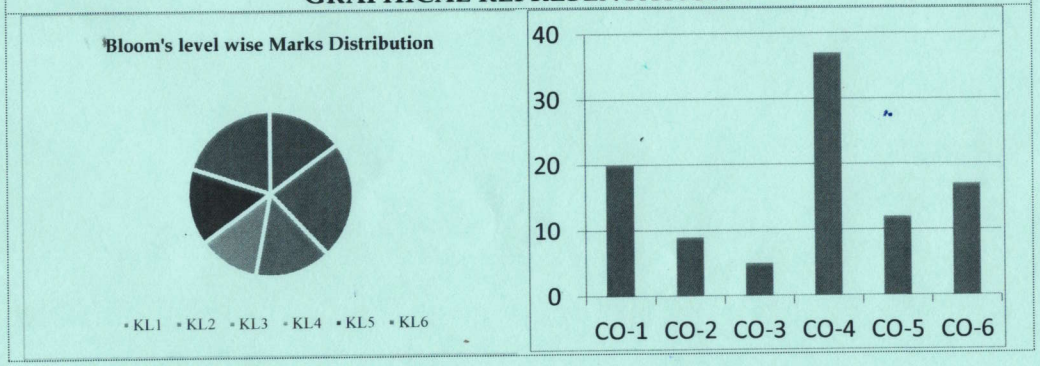
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Write a program to create a 4×4 matrix and display its transpose using a function.	10	CO1	K3
9	What is inheritance? Mention its types. Explain how Java achieves multiple inheritance using a suitable program.	10	CO2	K4
10	What is multithreading? Explain the two primary ways to create threads in Java. Also, write a program to demonstrate threads creation and execution using the Runnable interface.	10	CO3	K2
11	Design a GUI application using AWT or Swing to accept user input and display the result. Explain the components used.	10	CO4	K5
12	Write an applet program to demonstrate interaction with the client environment and explain the applet life cycle.	10	CO5	K6

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

Course Outcomes	CO1	Understand the concept of different types of data structure.
	CO2	Analyse the performance of different algorithms and various operations on data structures.
	CO3	Apply the basic concepts of Stack, Queue and linked list and their applications
	CO4	Design Tree and Graph to use them in various real life applications.
	CO5	Understand the concept of hashing, collision and its resolution methods
	CO6	Analyse the performance of different algorithms and various operations on data structures.

GRAPHICAL REPRESENTATION



ARKA JAIN University
Jharkhand
NAAC GRADE A ACCREDITED UNIVERSITY

[30-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**CSE / AIML / AIDS**	**Branch**	**B. Tech**
Subject Name	**Data Structure**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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

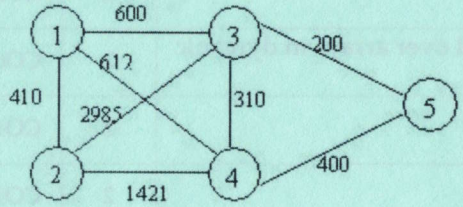
Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	Define linear and non-linear data structure with example of each.	2	CO1	K1
ii	Describe time and space complexity.	2	CO2	K2
iii	What do you mean by overflow and underflow condition in stack?	2	CO2	K1
iv	Why linked lists are preferred over arrays in dynamic memory allocation?	2	CO6	K4
v	Define AVL trees.	2	CO1	K1
vi	What is FIFO?	2	CO1	K2
vii	Define max heap and min heap.	2	CO1	K2
viii	What do you mean by collision in hashing?	2	CO5	K2
ix	Describe basic operations on data structure.	2	CO1	K1
x	What is complete graph?	2	CO4	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Differentiate between array and linked list.	05	CO1	K4
3	Translate infix expression into its equivalent post fix expression: (A-B)*(D/E)	05	CO6	K5
4	Explain quick sort with an example and analyse its complexities.	05	CO2	K4
5	Differentiate between linear search and binary search algorithms.	05	CO1	K2
6	Explain the concept of linked lists and its various operations.	05	CO3	K1
7	Define tree and its terminologies. List binary tree traversal techniques.	05	CO4	K3

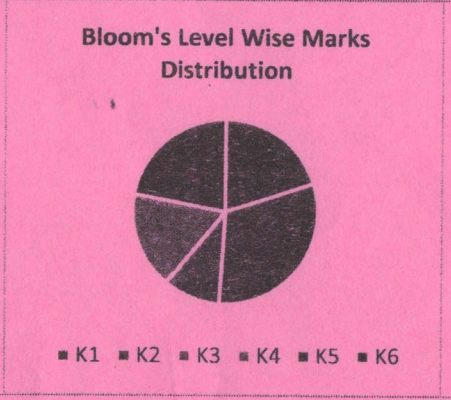
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

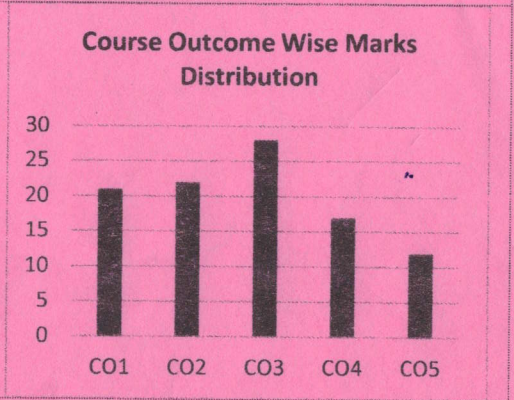
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the procedure for bubble sort and perform sorting on given list: 20, 35, 40, 100, 3, 10, 15.	10	CO6	K5
9	What is a minimum spanning tree? Convert the given graph with weighted edges to minimal spanning tree. 	10	CO4	K6
10	Define tree and its terminologies. Explain binary tree representation and traversal techniques with examples.	10	CO4	K1
11	Define hashing. Describe hash functions and collision resolution techniques.	10	CO5	K2
12	Explain Breadth First Search (BFS) and Depth First Search (DFS) graph traversal algorithms with examples.	10	CO4	K6

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

Course Outcomes	CO1	Understand the basics of instruction sets and their impact on processor design
	CO2	Demonstrate an understanding of the design of the functional units of a digital computer system
	CO3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory
	CO4	Design a pipeline for consistent execution of instructions with minimum hazards
	CO5	Recognize and manipulate representations of numbers stored in digital computers

GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand

NAAC GRADE A
ACCREDITED UNIVERSITY

[02-02-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	CSE / AIDS (IBM) / AIML	Program	B. Tech
Subject Name	Computer Organization & Architecture	Session	Odd 2025-26
Semester	III	Year	Jan, 2026

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
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- 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 1	QUESTIONS	Marks	COs	KL
i	What is an interrupt?	2	CO1	K1
ii	Explain about Arithmetic and Logic Unit.	2	CO2	K2
iii	What is synchronous data transfer?	2	CO3	K1
iv	Define an instruction format. List different types of instruction formats.	2	CO1	K2
v	What is auxiliary memory?	2	CO3	K1
vi	Justify the need for using cache memory?	2	CO3	K4
vii	What is pipelining?	2	CO4	K1
viii	Define addressing mode. Explain any 1 addressing mode with example.	2	CO1	K1
ix	What is cache coherence problem?	2	CO3	K2
x	Perform the arithmetic operations (-25) + (-21) in binary using signed 2's complement representation for negative numbers	2	CO5	K5

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 RISC and CISC architecture	05	CO2	K4
3	Illustrate and explain the steps involved in an instruction cycle.	05	CO1	K3
4	What are pipelining hazards? What are their types?	05	CO4	K2
5	Discuss the various types of cache miss.	05	CO3	K2
6	A cache memory needs an access time of 50 ns and main memory needs an access time of 150 ns. What is the average access time of CPU? Assume hit ratio = 80 %.	05	CO3	K3
7	Discuss basic functional units of computer in details.	05	CO2	K2

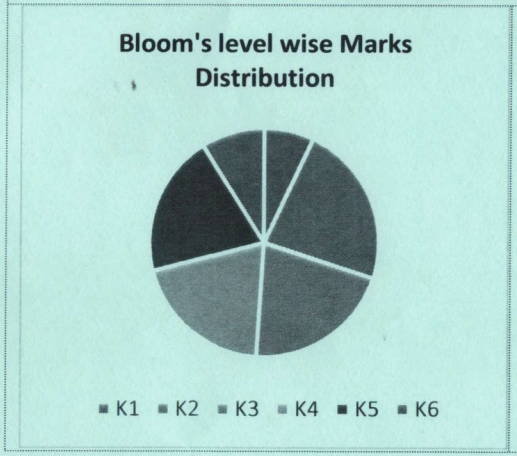
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

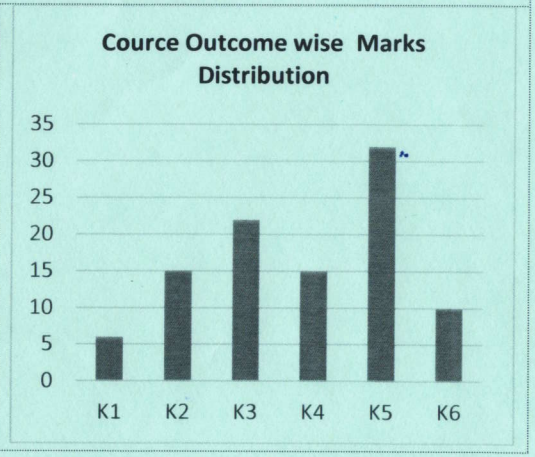
Q. No.	QUESTIONS	Marks	COs	KL
8	Consider a pipeline having 4 phases with duration 60ns, 50ns, 90ns and 80ns. Given latch delay is 10ns. Calculate: a. Pipeline cycle time b. Non-pipeline execution time c. Speedup-ratio d. Pipeline time for 1000 tasks. e. Sequential time for 1000 tasks f. Throughput	10	CO4	K5
9	Analyze the different modes of data transfer: Programmed I/O, Interrupt-driven I/O, DMA	10	CO1	K4
10	Explain any five addressing modes in detail with examples.	10	CO2	K1
11	Perform below multiplication using booth's multiplication algorithm for signed numbers: 9 x (-6)	10	CO5	K5
12	Explain memory hierarchy with proper diagram. Analyse each level of the hierarchy in terms of time, capacity and cost. Give reason why cache is used?	10	CO3	K2

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

Course Outcomes	CO1	The mathematical tools needed in evaluating multiple integrals and their usage.
	CO2	The effective mathematical tools for the solutions of differential equations that model physical processes.
	CO3	The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems
	CO4	An ability to apply effective, creative and innovative solutions, both independently and cooperatively, to current and future problems.
	CO5	A commitment to continuing learning and the capacity to maintain intellectual curiosity.
	CO6	An ability to develop statistical technique, data sampling.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand — NAAC GRADE A — ACCREDITED UNIVERSITY

[17-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**EEE /ME/CSE /AIDS(IBM)/AIML**	**Branch**	**B. Tech**
Subject Name	**Engineering Mathematics-III**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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 1	QUESTIONS	Marks	COs	KL
i	If $u_0 = 3$, $u_1 = 12$, $u_2 = 18$, $u_3 = 2000$, $u_4 = 100$, calculate Δu_0.	2	CO3	K1
ii	Write the relation between Mean, Median and Mode.	2	CO1	K2
iii	Write the Lagrange's Interpolation formula.	2	CO2	K2
iv	Write the formula for numerical differentiation.	2	CO1	K2
v	Find the variance for the data given : X: 0 1 2 3 $p(x)$: $\frac{1}{8}$ $\frac{3}{8}$ $\frac{3}{8}$ $\frac{1}{8}$	2	CO5	K1
vi	Define sample in sampling theory.	2	CO3	K5
vii	Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even?	2	CO2	K1
viii	Determine which numerical method is best suited for solving nonlinear equations with rapid convergence, and justify your choice.	2	CO1	K2

ix	Define Random Variable with an example.	2	CO3	K2
x	If the value of mode is 25.5 and median is 16.5 then find mean?	2	CO1	K3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Find the real root of the equation x^3 - 4x -9= 0 using Bisection Method.	05	CO2	K5
3	A random variable X has the following probability function X: 0 1 2 3 4 5 6 7 P(x): 0 k 2k 2k 3k K^2 $2K^2$ $7K^2+k$ Find (i) value of k (ii) Evaluate P(X<6)	05	CO2	K5
4	Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by Simpson's 1/3 rule.	05	CO2	K3
5	Find the value of Y when X= 10, by Lagrange's interpolation formula x: 5 6 9 11 y: 12 13 14 16	05	CO1	K3
6	Find u_9 if $u_0 = 14, u_4 = 24, u_8 = 32, u_{12} = 35, u_{16} = 40$, using Gauss forward formula	05	CO1	K4
7	Find mean and variance: x={ 1,2,3,4,5,6} ; x= no. of appears on the die X: 0 1 2 3 4 5 6 p(x): 0 $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$	05	CO2	K2

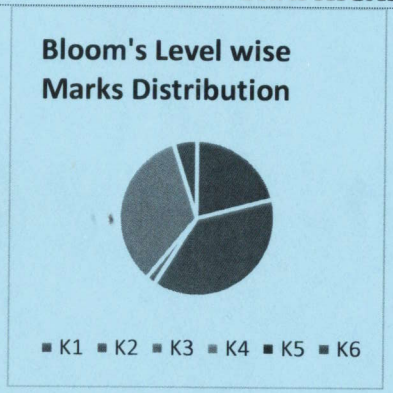
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

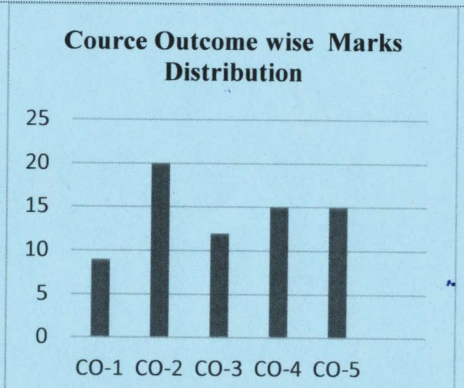
Q. No.	QUESTIONS	Marks	COs	KL
8	Evaluate $\int_0^6 x \sec x \, dx$ using 8 intervals by Trapezoidal rule.	10	CO1	K4
9	If X is a continuous random variable with the p.d.f $f(x)=\begin{cases} a(2x-x^2), & 0 \le x \le 2 \\ 0, & otherwise \end{cases}$ Find (i) a	10	CO3	K5
	(ii) p(x>1).			
10	Fit a straight line for the following data by least square method X: 1 2 3 4 6 8 Y: 2.4 3 3.6 4 5 6	10	CO6	K6
11	Find the value of y for x=0.1 by Picard's method. Given that $\frac{dy}{dx} = \frac{y-x}{y+x}$; y(0) =1.	10	CO3	K3
12	Find the real root of the equation x^3 - 3x - 5= 0 by Newtons-Raphson method	10	CO2	K5

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

Course Outcomes	CO1	Understand basic gender concepts and socialization processes.
	CO2	Analyze different types of gender roles and relationships.
	CO3	Evaluate the division and valuation of labour in gender contexts.
	CO4	Analyze types and consequences of gender-based violence.
	CO5	Analyze gender representation in media and culture.

GRAPHICAL REPRESENTATION





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[20-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**EEE / ME / CSE / AIML / AIDS**	Branch	**B. Tech**
Subject Name	**Gender Sensitization**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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 **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 01 Marks from Q1-i to v) – 05 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	Which document allows third gender identity on official records in India? a) Driving license b) Aadhar Card c) Passport d) All of the above	01	CO1	KL1
ii	Lack of awareness about the third gender leads to: a) Equality b) Acceptance c) Discrimination d) Empowerment	01	CO2	KL4
iii	What does gender sensitization primarily aim to achieve? a) Promote one gender over another b) Create awareness and change attitudes towards gender equality c) Encourage traditional gender roles d) Limit participation of women in workplaces.	01	CO1	KL2
iv	Media can support third gender equality by: a) Spreading myths b) Showing negative images c) Promoting positive representation	01	CO3	KL5

	d) Avoiding the topic			
v	Which area is most affected by inequality faced by the third gender? a) Entertainment b) Education and employment c) Sports d) Tourism	01	CO1	KL3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Define Gender.	02	CO1	KL2
3	Stereotype means?	02	CO2	KL1
4	Which legislation in India focuses on preventing sexual harassment at the workplace?	02	CO3	KL3
5	State down the meaning of Patriarchy.	02	CO3	KL2
6	What is sexual harassment?	02	CO2	KL5
7	Mention any two **rights of women** in India.	02	CO3	KL4

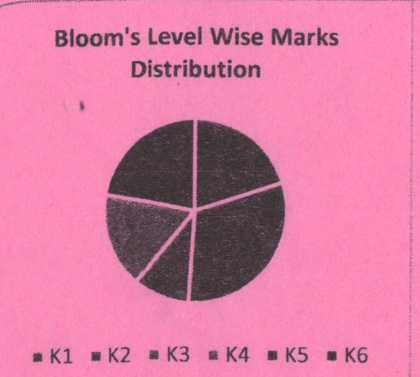
Section C (Answer any TWO out of FOUR) – 20Marks
(Each question Carry 10 Marks)

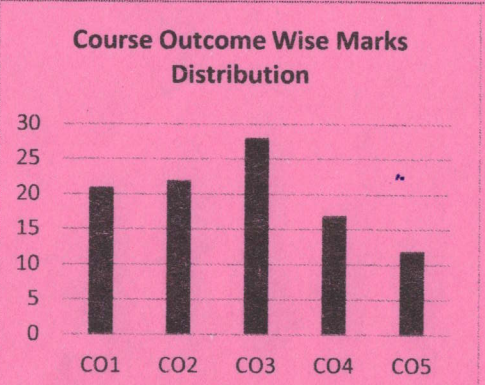
Q. No.	QUESTIONS	Marks	COs	KL
8	Briefly explain about the "Gender Sensitization".	10	CO2	KL2
9	Explain any 5 Equal rights.	10	CO1	KL5
10	Differentiate between the following: EQUALITY AND INEQUALITY	10	CO2	KL5
11	Explain in details – WOMANHOOD AND MANHOOD.	10	CO3	KL3

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

Course Outcomes	CO1	Understand the basics of instruction sets and their impact on processor design
	CO2	Demonstrate an understanding of the design of the functional units of a digital computer system
	CO3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory
	CO4	Design a pipeline for consistent execution of instructions with minimum hazards
	CO5	Recognize and manipulate representations of numbers stored in digital computers

GRAPHICAL REPRESENTATION





ARKA JAIN University
Jharkhand

NAAC GRADE A
ACCREDITED UNIVERSITY

[02-02-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	CSE / AIDS (IBM) / AIML	Program	B. Tech
Subject Name	Computer Organization & Architecture	Session	Odd 2025-26
Semester	III	Year	Jan, 2026

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 1	QUESTIONS	Marks	COs	KL
i	What is an interrupt?	2	CO1	K1
ii	Explain about Arithmetic and Logic Unit.	2	CO2	K2
iii	What is synchronous data transfer?	2	CO3	K1
iv	Define an instruction format. List different types of instruction formats.	2	CO1	K2
v	What is auxiliary memory?	2	CO3	K1
vi	Justify the need for using cache memory?	2	CO3	K4
vii	What is pipelining?	2	CO4	K1
viii	Define addressing mode. Explain any 1 addressing mode with example.	2	CO1	K1
ix	What is cache coherence problem?	2	CO3	K2
x	Perform the arithmetic operations (-25) + (-21) in binary using signed 2's complement representation for negative numbers	2	CO5	K5

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 RISC and CISC architecture	05	CO2	K4
3	Illustrate and explain the steps involved in an instruction cycle.	05	CO1	K3
4	What are pipelining hazards? What are their types?	05	CO4	K2
5	Discuss the various types of cache miss.	05	CO3	K2
6	A cache memory needs an access time of 50 ns and main memory needs an access time of 150 ns. What is the average access time of CPU? Assume hit ratio = 80 %.	05	CO3	K3
7	Discuss basic functional units of computer in details.	05	CO2	K2

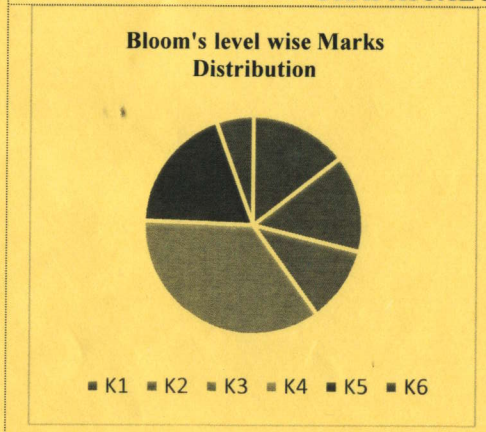
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

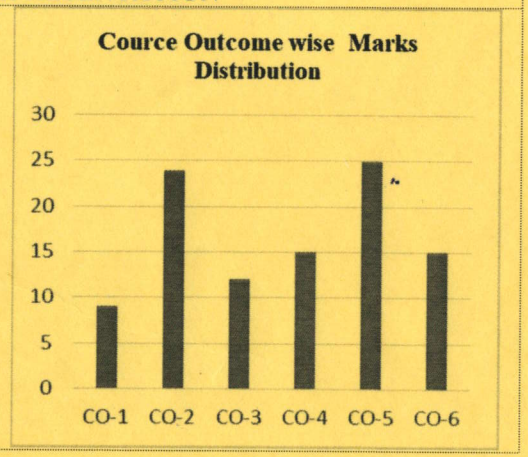
Q. No.	QUESTIONS	Marks	COs	KL
8	Consider a pipeline having 4 phases with duration 60ns, 50ns, 90ns and 80ns. Given latch delay is 10ns. Calculate: a. Pipeline cycle time b. Non-pipeline execution time c. Speedup-ratio d. Pipeline time for 1000 tasks. e. Sequential time for 1000 tasks f. Throughput	10	CO4	K5
9	Analyze the different modes of data transfer: Programmed I/O, Interrupt-driven I/O, DMA	10	CO1	K4
10	Explain any five addressing modes in detail with examples.	10	CO2	K1
11	Perform below multiplication using booth's multiplication algorithm for signed numbers: 9 x (-6)	10	CO5	K5
12	Explain memory hierarchy with proper diagram. Analyse each level of the hierarchy in terms of time, capacity and cost. Give reason why cache is used?	10	CO3	K2

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

Course Outcomes	CO1	Understand the concepts of digital electronics.
	CO2	Formulate and solve problems related to combinational and sequential circuits.
	CO3	Apply the concept of digital electronics in circuit design.
	CO4	Analyze and test digital circuits.
	CO5	Correlate the concepts of one module to the concepts in other modules.
	CO6	Analyze the working principles and design of digital converters.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand | NAAC GRADE A

[22-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	CSE / AIDS(IBM) / AIML	Branch	B. Tech
Subject Name	Digital Electronics	Session	Odd, 2025-26
Semester	III	Year	Jan, 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 1	QUESTIONS	Marks	COs	KL
i	Differentiate between volatile and non-volatile binary storage.	2	CO1	K1
ii	Define Boolean Algebra	2	CO2	K2
iii	What are don't-care conditions?	2	CO2	K1
iv	What is the difference between Multiplexer and De multiplexer?	2	CO3	K3
v	Apply De-Morgan's theorem to $((A + B)'(C + D))'$.	2	CO1	K3
vi	Differentiate between Encoder & Decoder.	2	CO2	K1
vii	How do sequential circuits differ from combinational circuits?	2	CO2	K1
viii	Reduce the expression $(X + Y')(X + Y + Z)$.	2	CO1	K4
ix	What is memory decoding?	2	CO4	K1
x	Prove the expression: $A + A'B = A + B$	2	CO4	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Given Y (W, X, Y, Z) = ∑m (2, 4, 6, 9, 10, 12, 14), draw the K-map and obtain the simplified expression.	05	CO3	K5
3	Design a logic circuit for F (A, B, C) = Π (0, 2, 3, 4) using NOR gates only.	05	CO2	K2
4	Define counters and classify them with proper explanation & circuit diagram.	05	CO2	K1
5	Implement a full adder using two half adders and OR gate.	05	CO2	K6
6	Explain the architecture and implementation of a Programmable Logic Array (PLA).	05	CO4	K6
7	Design a 4 bit synchronous counter using T flip-flops.	05	CO1	K6

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

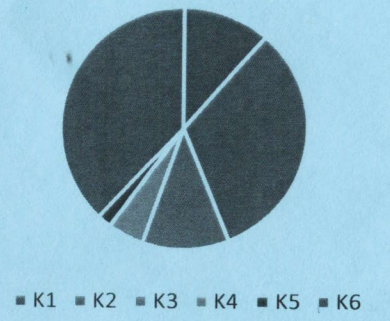
Q. No.	QUESTIONS	Marks	COs	KL
8	Draw and explain the working of all logic gates: AND, OR, NOT, NAND, NOR, XOR, XNOR.	10	CO2	K4
9	Minimize the function F (W, X, Y, Z) = Σ (1, 3, 7, 11, 15) using a K-map and implement it using NAND gates only.	10	CO1	K5
10	Design a 3-to-8 line decoder and explain the logic diagram and truth table.	10	CO2	K6
11	Explain the working principle of an Analog to Digital Converter (ADC) with a suitable diagram.	10	CO4	K3
12	Design a 4-bit shift register and explain the working of different types: SIPO, PISO, SISO, and PIPO.	10	CO2	K6

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

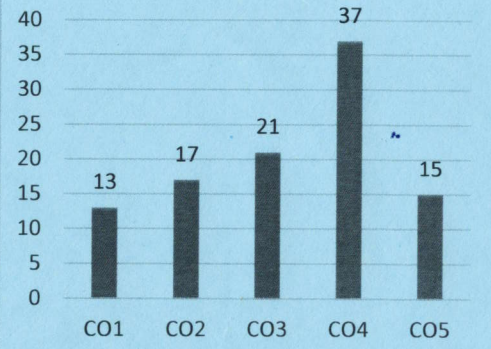
Course Outcomes	CO1	Specify simple abstract data types and design implementations, using abstraction functions to document them
	CO2	Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity
	CO3	Name and apply some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

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



Course Outcome wise Marks Distribution



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ARKA JAIN University Jharkhand — NAAC GRADE A — ACCREDITED UNIVERSITY

[28-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**CSE / AIML**	**Branch**	**B. Tech**
Subject Name	**Object Oriented Programming Through Java**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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 1	QUESTIONS	Marks	COs	KL
i	What is type casting? Show an example of explicit type casting.	2	CO1	K1
ii	Create a code to show the use of do-while loop.	2	CO2	K2
iii	What happens when break is not used in menu driven program?	2	CO1	K1
iv	When do we find the exception "Array Index Out of Bounds"?	2	CO3	K4
v	How is vector better than array in Java?	2	CO3	K1
vi	Explain the role of JIT.	2	CO1	K1
vii	Where do use the keyword extends? Give one example.	2	CO3	K5
viii	How java does achieves multiple inheritance?	2	CO1	K1
ix	Compare text file and binary file.	2	CO4	K2
x	What is the role of a package in Java?	2	CO5	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	What is the importance of JVM? Explain in detail.	05	CO1	K2
3	Differentiate between function overloading and overriding with proper example.	05	CO3	K6
4	What is an exception? Write a sample code to show the use of arithmetic exception.	05	CO4	K6
5	Create a java code to show the use of following string functions: length(), substring(), charAt().	05	CO2	K2
6	With reference to recursion, what is a base condition? Give example to justify.	05	CO4	K6
7	What is a wrapper class? Give an example to show its use.	05	CO4	K6

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

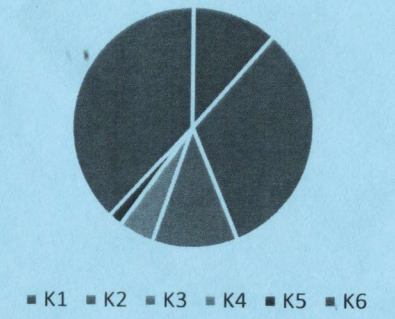
Q. No.	QUESTIONS	Marks	COs	KL
8	What is polymorphism? Name its types. Write a Java code to show the use of polymorphism	10	CO5	K3
9	Explain the concept of inheritance and its types in Java. Create a program to show the use of any one type of inheritance.	10	CO3	K2
10	Write a program to create a SDA having 10 values and perform binary search.	10	CO4	K6
11	What is access specifier? Explain its types and importance of each.	10	CO2	K2
12	Write short notes on: encapsulation, vector, finally.	10	CO4	K6

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

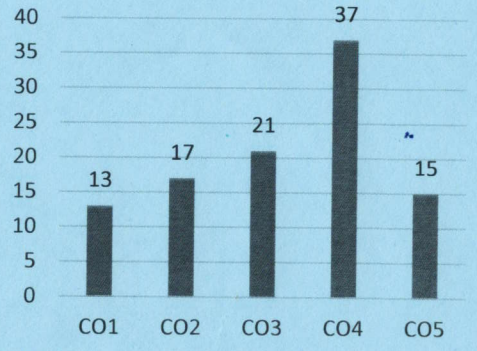
Course Outcomes	CO1	Specify simple abstract data types and design implementations, using abstraction functions to document them
	CO2	Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity
	CO3	Name and apply some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

GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



Course Outcome wise Marks Distribution



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ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY

[28-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**CSE / AIML**	**Branch**	**B. Tech**
Subject Name	**Object Oriented Programming Through Java**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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

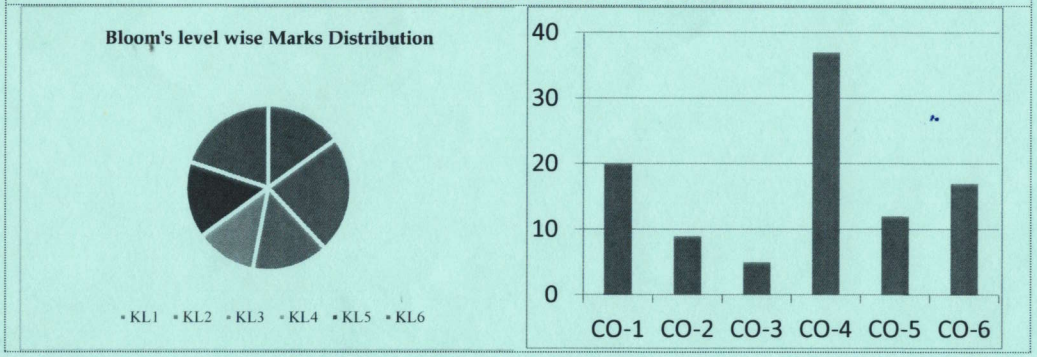
Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	What is type casting? Show an example of explicit type casting.	2	CO1	K1
ii	Create a code to show the use of do-while loop.	2	CO2	K2
iii	What happens when break is not used in menu driven program?	2	CO1	K1
iv	When do we find the exception "Array Index Out of Bounds"?	2	CO3	K4
v	How is vector better than array in Java?	2	CO3	K1
vi	Explain the role of JIT.	2	CO1	K1
vii	Where do use the keyword extends? Give one example.	2	CO3	K5
viii	How java does achieves multiple inheritance?	2	CO1	K1
ix	Compare text file and binary file.	2	CO4	K2
x	What is the role of a package in Java?	2	CO5	K1

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

Course Outcomes	CO1	Understand the concept of different types of data structure.
	CO2	Analyse the performance of different algorithms and various operations on data structures.
	CO3	Apply the basic concepts of Stack, Queue and linked list and their applications
	CO4	Design Tree and Graph to use them in various real life applications.
	CO5	Understand the concept of hashing, collision and its resolution methods
	CO6	Analyse the performance of different algorithms and various operations on data structures.

GRAPHICAL REPRESENTATION



JGI **ARKA JAIN University** Jharkhand | NAAC GRADE A ACCREDITED UNIVERSITY

[30-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**CSE / AIML / AIDS**	**Branch**	**B. Tech**
Subject Name	**Data Structure**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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

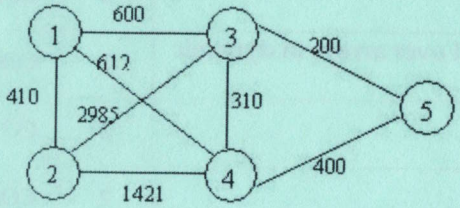
Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	Define linear and non-linear data structure with example of each.	2	CO1	K1
ii	Describe time and space complexity.	2	CO2	K2
iii	What do you mean by overflow and underflow condition in stack?	2	CO2	K1
iv	Why linked lists are preferred over arrays in dynamic memory allocation?	2	CO6	K4
v	Define AVL trees.	2	CO1	K1
vi	What is FIFO?	2	CO1	K2
vii	Define max heap and min heap.	2	CO1	K2
viii	What do you mean by collision in hashing?	2	CO5	K2
ix	Describe basic operations on data structure.	2	CO1	K1
x	What is complete graph?	2	CO4	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Differentiate between array and linked list.	05	CO1	K4
3	Translate infix expression into its equivalent post fix expression: (A-B)*(D/E)	05	CO6	K5
4	Explain quick sort with an example and analyse its complexities.	05	CO2	K4
5	Differentiate between linear search and binary search algorithms.	05	CO1	K2
6	Explain the concept of linked lists and its various operations.	05	CO3	K1
7	Define tree and its terminologies. List binary tree traversal techniques.	05	CO4	K3

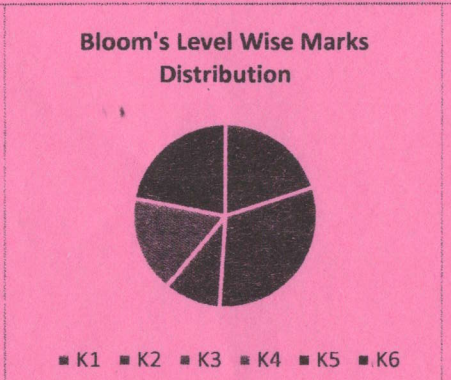
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

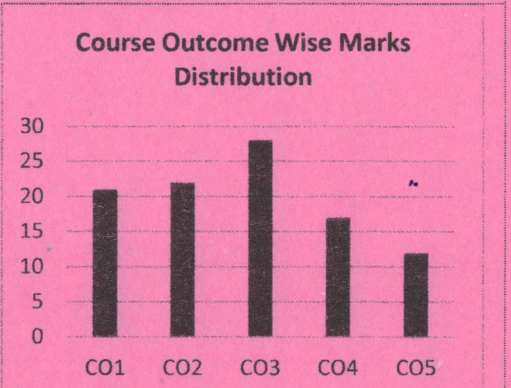
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the procedure for bubble sort and perform sorting on given list: 20, 35, 40, 100, 3, 10, 15.	10	CO6	K5
9	What is a minimum spanning tree? Convert the given graph with weighted edges to minimal spanning tree. 	10	CO4	K6
10	Define tree and its terminologies. Explain binary tree representation and traversal techniques with examples.	10	CO4	K1
11	Define hashing. Describe hash functions and collision resolution techniques.	10	CO5	K2
12	Explain Breadth First Search (BFS) and Depth First Search (DFS) graph traversal algorithms with examples.	10	CO4	K6

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

Course Outcomes	CO1	Understand the basics of instruction sets and their impact on processor design
	CO2	Demonstrate an understanding of the design of the functional units of a digital computer system
	CO3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory
	CO4	Design a pipeline for consistent execution of instructions with minimum hazards
	CO5	Recognize and manipulate representations of numbers stored in digital computers

GRAPHICAL REPRESENTATION





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[02-02-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	CSE / AIDS (IBM) / AIML	Program	B. Tech
Subject Name	Computer Organization & Architecture	Session	Odd 2025-26
Semester	III	Year	Jan, 2026

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 1	QUESTIONS	Marks	COs	KL
i	What is an interrupt?	2	CO1	K1
ii	Explain about Arithmetic and Logic Unit.	2	CO2	K2
iii	What is synchronous data transfer?	2	CO3	K1
iv	Define an instruction format. List different types of instruction formats.	2	CO1	K2
v	What is auxiliary memory?	2	CO3	K1
vi	Justify the need for using cache memory?	2	CO3	K4
vii	What is pipelining?	2	CO4	K1
viii	Define addressing mode. Explain any 1 addressing mode with example.	2	CO1	K1
ix	What is cache coherence problem?	2	CO3	K2
x	Perform the arithmetic operations (-25) + (-21) in binary using signed 2's complement representation for negative numbers	2	CO5	K5

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 RISC and CISC architecture	05	CO2	K4
3	Illustrate and explain the steps involved in an instruction cycle.	05	CO1	K3
4	What are pipelining hazards? What are their types?	05	CO4	K2
5	Discuss the various types of cache miss.	05	CO3	K2
6	A cache memory needs an access time of 50 ns and main memory needs an access time of 150 ns. What is the average access time of CPU? Assume hit ratio = 80 %.	05	CO3	K3
7	Discuss basic functional units of computer in details.	05	CO2	K2

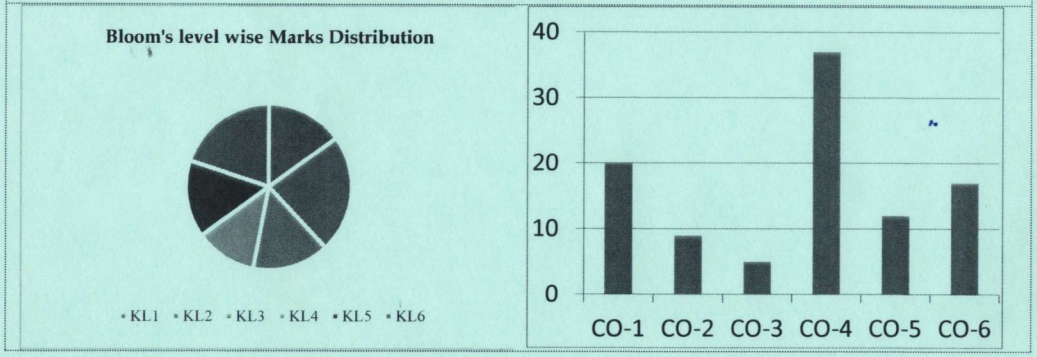
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Consider a pipeline having 4 phases with duration 60ns, 50ns, 90ns and 80ns. Given latch delay is 10ns. Calculate: a. Pipeline cycle time b. Non-pipeline execution time c. Speedup-ratio d. Pipeline time for 1000 tasks. e. Sequential time for 1000 tasks f. Throughput	10	CO4	K5
9	Analyze the different modes of data transfer: Programmed I/O, Interrupt-driven I/O, DMA	10	CO1	K4
10	Explain any five addressing modes in detail with examples.	10	CO2	K1
11	Perform below multiplication using booth's multiplication algorithm for signed numbers: 9 x (-6)	10	CO5	K5
12	Explain memory hierarchy with proper diagram. Analyse each level of the hierarchy in terms of time, capacity and cost. Give reason why cache is used?	10	CO3	K2

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

Course Outcomes	CO1	Understand the concept of different types of data structure.
	CO2	Analyse the performance of different algorithms and various operations on data structures.
	CO3	Apply the basic concepts of Stack, Queue and linked list and their applications
	CO4	Design Tree and Graph to use them in various real life applications.
	CO5	Understand the concept of hashing, collision and its resolution methods
	CO6	Analyse the performance of different algorithms and various operations on data structures.

GRAPHICAL REPRESENTATION



ARKA JAIN University
Jharkhand

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[30-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**CSE / AIML / AIDS**	**Branch**	**B. Tech**
Subject Name	**Data Structure**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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

Q. N 1	QUESTIONS	Marks	COs	KL
i	Define linear and non-linear data structure with example of each.	2	CO1	K1
ii	Describe time and space complexity.	2	CO2	K2
iii	What do you mean by overflow and underflow condition in stack?	2	CO2	K1
iv	Why linked lists are preferred over arrays in dynamic memory allocation?	2	CO6	K4
v	Define AVL trees.	2	CO1	K1
vi	What is FIFO?	2	CO1	K2
vii	Define max heap and min heap.	2	CO1	K2
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(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
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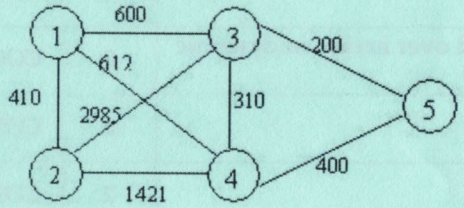
7	Define tree and its terminologies. List binary tree traversal techniques.	05	CO4	K3

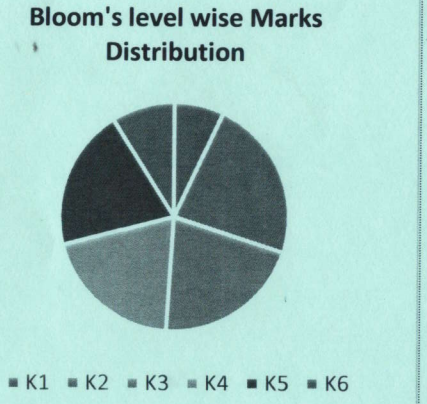
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

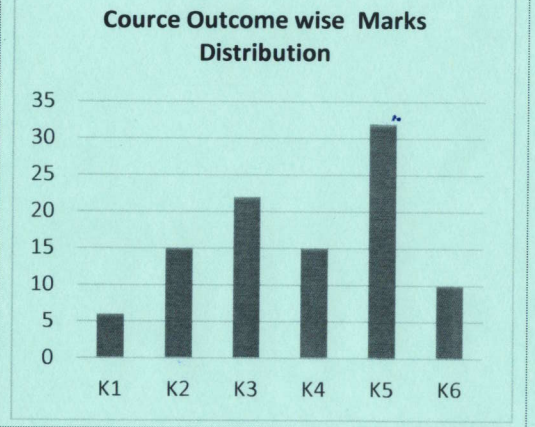
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the procedure for bubble sort and perform sorting on given list: 20, 35, 40, 100, 3, 10, 15.	10	CO6	K5
9	What is a minimum spanning tree? Convert the given graph with weighted edges to minimal spanning tree. 	10	CO4	K6
10	Define tree and its terminologies. Explain binary tree representation and traversal techniques with examples.	10	CO4	K1
11	Define hashing. Describe hash functions and collision resolution techniques.	10	CO5	K2
12	Explain Breadth First Search (BFS) and Depth First Search (DFS) graph traversal algorithms with examples.	10	CO4	K6

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

Course Outcomes	CO1	The mathematical tools needed in evaluating multiple integrals and their usage.
	CO2	The effective mathematical tools for the solutions of differential equations that model physical processes.
	CO3	The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems
	CO4	An ability to apply effective, creative and innovative solutions, both independently and cooperatively, to current and future problems.
	CO5	A commitment to continuing learning and the capacity to maintain intellectual curiosity.
	CO6	An ability to develop statistical technique, data sampling.

GRAPHICAL REPRESENTATION





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[17-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	**EEE /ME/CSE /AIDS(IBM)/AIML**	**Branch**	**B. Tech**
Subject Name	**Engineering Mathematics-III**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**

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 x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	If $u_0 = 3$, $u_1 = 12$, $u_2 = 18$, $u_3 = 2000$, $u_4 = 100$, calculate Δu_0.	2	CO3	K1
ii	Write the relation between Mean, Median and Mode.	2	CO1	K2
iii	Write the Lagrange's Interpolation formula.	2	CO2	K2
iv	Write the formula for numerical differentiation.	2	CO1	K2
v	Find the variance for the data given : X: 0 1 2 3 $p(x)$: $\frac{1}{8}$ $\frac{3}{8}$ $\frac{3}{8}$ $\frac{1}{8}$	2	CO5	K1
vi	Define sample in sampling theory.	2	CO3	K5
vii	Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even?	2	CO2	K1
viii	Determine which numerical method is best suited for solving nonlinear equations with rapid convergence, and justify your choice.	2	CO1	K2

ix	Define Random Variable with an example.	2	CO3	K2
x	If the value of mode is 25.5 and median is 16.5 then find mean?	2	CO1	K3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Find the real root of the equation x^3 - 4x -9= 0 using Bisection Method.	05	CO2	K5
3	A random variable X has the following probability function X: 0 1 2 3 4 5 6 7 P(x): 0 k 2k 2k 3k K^2 $2K^2$ $7K^2+k$ Find (i) value of k (ii) Evaluate P(X<6)	05	CO2	K5
4	Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by Simpson's 1/3 rule.	05	CO2	K3
5	Find the value of Y when X= 10, by Lagrange's interpolation formula x: 5 6 9 11 y: 12 13 14 16	05	CO1	K3
6	Find u_9 if $u_0 = 14, u_4 = 24, u_8 = 32, u_{12} = 35, u_{16} = 40$, using Gauss forward formula	05	CO1	K4
7	Find mean and variance: x={ 1,2,3,4,5,6} ; x= no. of appears on the die X: 0 1 2 3 4 5 6 p(x): 0 $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$	05	CO2	K2

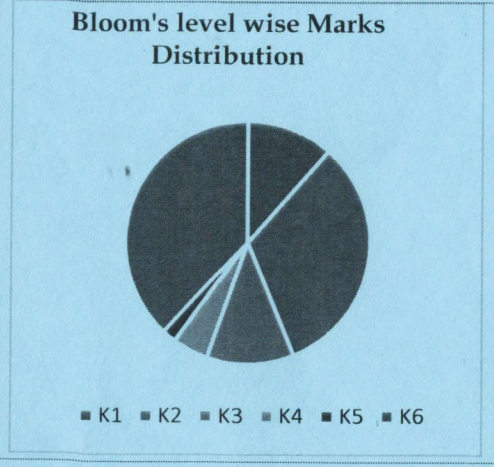
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

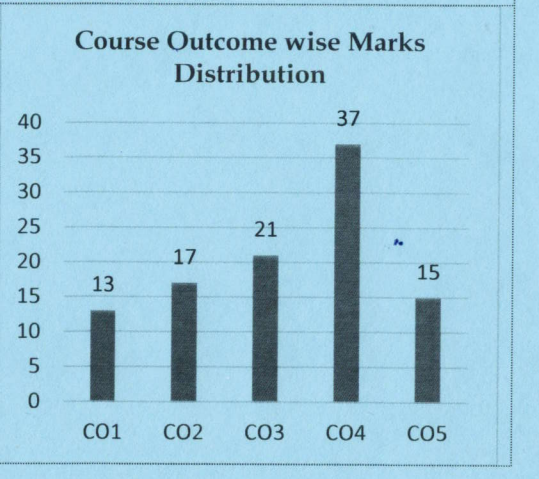
Q. No.	QUESTIONS	Marks	COs	KL
8	Evaluate $\int_0^6 x \sec x \, dx$ using 8 intervals by Trapezoidal rule.	10	CO1	K4
9	If X is a continuous random variable with the p.d.f $f(x)=\begin{cases} a(2x-x^2), & 0 \le x \le 2 \\ 0, & otherwise \end{cases}$ Find (i) a	10	CO3	K5
	(ii) p(x>1).			
10	Fit a straight line for the following data by least square method X: 1 2 3 4 6 8 Y: 2.4 3 3.6 4 5 6	10	CO6	K6
11	Find the value of y for x=0.1 by Picard's method. Given that $\frac{dy}{dx} = \frac{y-x}{y+x}$; y(0) =1.	10	CO3	K3
12	Find the real root of the equation x^3 - 3x - 5= 0 by Newtons-Raphson method	10	CO2	K5

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, and composition of systems based on object 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





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ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			**[28-01-2026] END SEM EXAMINATION School of Engineering & IT**
Program	**CSE / AIML**	**Branch**	**B. Tech**
Subject Name	**Object Oriented Programming Through Java**	**Session**	**Odd, 2025-26**
Semester	**III**	**Year**	**Jan, 2026**
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 1	QUESTIONS	Marks	COs	KL
i	What is type casting? Show an example of explicit type casting.	2	CO1	K1
ii	Create a code to show the use of do-while loop.	2	CO2	K2
iii	What happens when break is not used in menu driven program?	2	CO1	K1
iv	When do we find the exception "Array Index Out of Bounds"?	2	CO3	K4
v	How is vector better than array in Java?	2	CO3	K1
vi	Explain the role of JIT.	2	CO1	K1
vii	Where do use the keyword extends? Give one example.	2	CO3	K5
viii	How java does achieves multiple inheritance?	2	CO1	K1
ix	Compare text file and binary file.	2	CO4	K2
x	What is the role of a package in Java?	2	CO5	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	What is the importance of JVM? Explain in detail.	05	CO1	K2
3	Differentiate between function overloading and overriding with proper example.	05	CO3	K6
4	What is an exception? Write a sample code to show the use of arithmetic exception.	05	CO4	K6
5	Create a java code to show the use of following string functions: length(), substring(), charAt().	05	CO2	K2
6	With reference to recursion, what is a base condition? Give example to justify.	05	CO4	K6
7	What is a wrapper class? Give an example to show its use?	05	CO4	K6

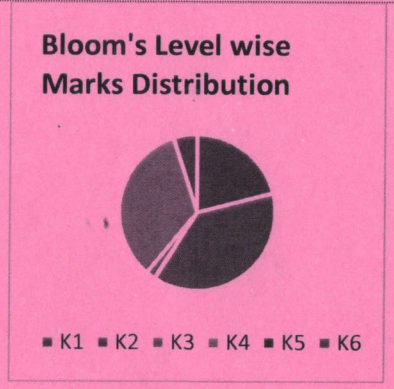
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

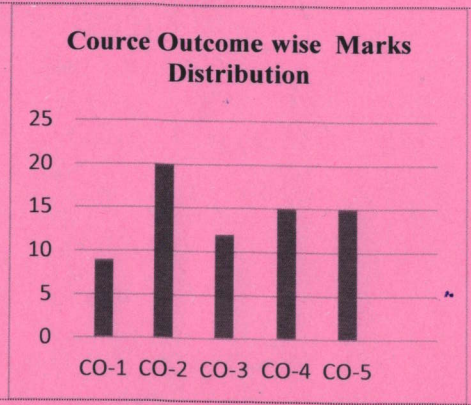
Q. No.	QUESTIONS	Marks	COs	KL
8	What is polymorphism? Name its types. Write a Java code to show the use of polymorphism	10	CO5	K3
9	Explain the concept of inheritance and its types in Java. Create a program to show the use of any one type of inheritance.	10	CO3	K2
10	Write a program to create a SDA having 10 values and perform binary search.	10	CO4	K6
11	What is access specifier? Explain its types and importance of each.	10	CO2	K2
12	Write short notes on: encapsulation, vector, finally.	10	CO4	K6

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

Course Outcomes	CO1	Understand basic gender concepts and socialization processes.
	CO2	Analyze different types of gender roles and relationships.
	CO3	Evaluate the division and valuation of labour in gender contexts.
	CO4	Analyze types and consequences of gender-based violence.
	CO5	Analyze gender representation in media and culture.

GRAPHICAL REPRESENTATION





JGi **ARKA JAIN University** Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			[20-01-2026] END SEM EXAMINATION School of Engineering & IT
Program	EEE / ME / CSE / AIML / AIDS	Branch	B. Tech
Subject Name	Gender Sensitization	Session	Odd, 2025-26
Semester	III	Year	Jan, 2026
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 **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 01 Marks from Q1-i to v) – 05 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	Which document allows third gender identity on official records in India? a) Driving license b) Aadhar Card c) Passport d) All of the above	01	CO1	KL1
ii	Lack of awareness about the third gender leads to: a) Equality b) Acceptance c) Discrimination d) Empowerment	01	CO2	KL4
iii	What does gender sensitization primarily aim to achieve? a) Promote one gender over another b) Create awareness and change attitudes towards gender equality c) Encourage traditional gender roles d) Limit participation of women in workplaces.	01	CO1	KL2
iv	Media can support third gender equality by: a) Spreading myths b) Showing negative images c) Promoting positive representation	01	CO3	KL5

	d) Avoiding the topic			
v	Which area is most affected by inequality faced by the third gender? a) Entertainment b) Education and employment c) Sports d) Tourism	01	CO1	KL3

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Define Gender.	02	CO1	KL2
3	Stereotype means?	02	CO2	KL1
4	Which legislation in India focuses on preventing sexual harassment at the workplace?	02	CO3	KL3
5	State down the meaning of Patriarchy.	02	CO3	KL2
6	What is sexual harassment?	02	CO2	KL5
7	Mention any two **rights of women** in India.	02	CO3	KL4

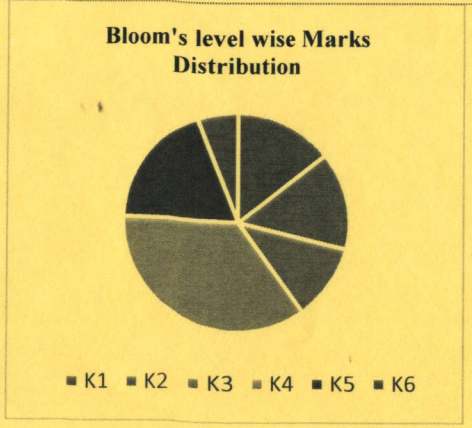
Section C (Answer any TWO out of FOUR) – 20Marks
(Each question Carry 10 Marks)

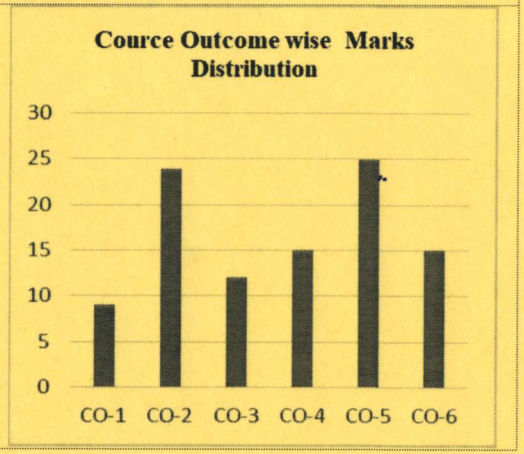
Q. No.	QUESTIONS	Marks	COs	KL
8	Briefly explain about the "Gender Sensitization".	10	CO2	KL2
9	Explain any 5 Equal rights.	10	CO1	KL5
10	Differentiate between the following: EQUALITY AND INEQUALITY	10	CO2	KL5
11	Explain in details – WOMANHOOD AND MANHOOD.	10	CO3	KL3

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

Course Outcomes	CO1	Understand the concepts of digital electronics.
	CO2	Formulate and solve problems related to combinational and sequential circuits.
	CO3	Apply the concept of digital electronics in circuit design.
	CO4	Analyze and test digital circuits.
	CO5	Correlate the concepts of one module to the concepts in other modules.
	CO6	Analyze the working principles and design of digital converters.

GRAPHICAL REPRESENTATION





ARKA JAIN University Jharkhand | NAAC GRADE A ACCREDITED UNIVERSITY

[22-01-2026]
END SEM EXAMINATION
School of Engineering & IT

Program	CSE / AIDS(IBM) / AIML	Branch	B. Tech
Subject Name	Digital Electronics	Session	Odd, 2025-26
Semester	III	Year	Jan, 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 1	QUESTIONS	Marks	COs	KL
i	Differentiate between volatile and non-volatile binary storage.	2	CO1	K1
ii	Define Boolean Algebra	2	CO2	K2
iii	What are don't-care conditions?	2	CO2	K1
iv	What is the difference between Multiplexer and De multiplexer?	2	CO3	K3
v	Apply De-Morgan's theorem to **((A + B)′ (C + D)) ′.**	2	CO1	K3
vi	Differentiate between Encoder & Decoder.	2	CO2	K1
vii	How do sequential circuits differ from combinational circuits?	2	CO2	K1
viii	Reduce the expression (X + Y') (X + Y + Z).	2	CO1	K4
ix	What is memory decoding?	2	CO4	K1
x	Prove the expression: A + A'B = A + B	2	CO4	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Given Y (W, X, Y, Z) = ∑m (2, 4, 6, 9, 10, 12, 14), draw the K-map and obtain the simplified expression.	05	CO3	K5
3	Design a logic circuit for F (A, B, C) = Π (0, 2, 3, 4) using NOR gates only.	05	CO2	K2
4	Define counters and classify them with proper explanation & circuit diagram.	05	CO2	K1
5	Implement a full adder using two half adders and OR gate.	05	CO2	K6
6	Explain the architecture and implementation of a Programmable Logic Array (PLA).	05	CO4	K6
7	Design a 4 bit synchronous counter using T flip-flops.	05	CO1	K6

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 working of all logic gates: AND, OR, NOT, NAND, NOR, XOR, XNOR.	10	CO2	K4
9	Minimize the function F (W, X, Y, Z) = Σ (1, 3, 7, 11, 15) using a K-map and implement it using NAND gates only.	10	CO1	K5
10	Design a 3-to-8 line decoder and explain the logic diagram and truth table.	10	CO2	K6
11	Explain the working principle of an Analog to Digital Converter (ADC) with a suitable diagram.	10	CO4	K3
12	Design a 4-bit shift register and explain the working of different types: SIPO, PISO, SISO, and PIPO.	10	CO2	K6