16/01/25

ARKA JAIN University, Jharkhand — NAAC GRADE A — ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science & Engineering	Program	Diploma
Subject Name	Data Structures	Semester	III
		Year	January, 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)

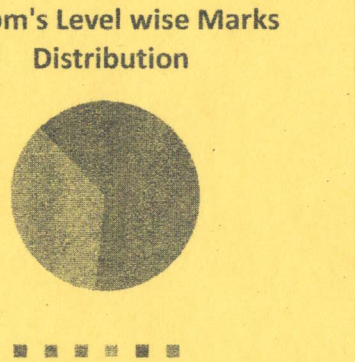
Q. N 1	QUESTIONS	Marks	COs	KL
i	Explain time and space complexity in problem solving	02	CO1	K4
ii	Define algorithm. Mention the characteristics for an algorithm to be useful.	02	CO2	K2
iii	Mention the overflow and underflow condition of stack.	02	CO3	K2
iv	Write the difference between single linked list and double linked list with an example	02	CO3	K1
v	Analyze and explain about the drawbacks of stack and queue due to which linked list has come to picture.	02	CO3	K1
vi	What do you mean by weighted and non-weighted graph	02	CO5	K4
vii	Mention the differences between tree and graph	02	CO5	K4
viii	Differentiate between full binary tree and complete binary tree.	02	CO5	K2
ix	Differentiate between extended binary tree and skew binary tree	02	CO3	K4
x	Convert the following infix operation to prefix operation using standard arithmetic operators and precedence level:(A+B*(C-D^E)/F)	02	CO3	K2

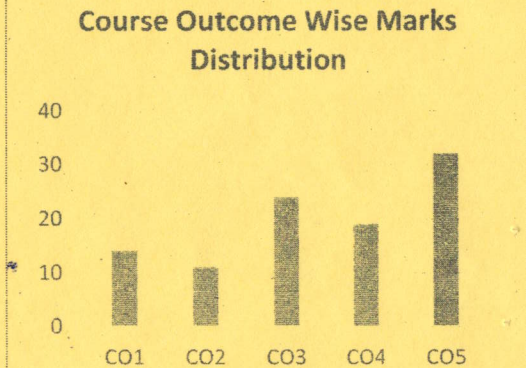
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	**QUESTIONS**	**Marks**	**COs**	**KL**
2	Draw and explain Adjacency Matrix and mention the advantages of adjacency matrix	05	CO4	K6
3	Convert the following Infix into Postfix expression: A+(B*C)/D	05	CO3	K4
4	Write an algorithm to insert an item in a Queue data structure and explain each step	05	CO3	K6
5	Explain the Pre-order, In-order and Post-order traversal in Tree data structure.	05	CO5	K2
6	Evaluate the following postfix expression using stack: P=BC*DEF^/- where B=5, C=6, D=24, E=2, F=3. So, P=5,6,*,24,2,3,^,/,-	05	CO4	K2
7	Create an algorithm for Push and Pop operations on Stack using Arrays	05	CO5	K1
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)				
Q. No.	**QUESTIONS**	**Marks**	**COs**	**KL**
8	Create a Binary search Tree for the following values 45, 15, 79, 90, 10, 55, 12, 20, 50 and perform Binary search Tree (BST) Traversals.	10	CO4	K2
9	Write a C Program to insert an element after a specific node in a single linked list by using structure	10	CO3	K4
10	Define Tree. Explain the tree traversals with algorithms and examples.	10	CO2	K2
11	Convert an infix operation to prefix operation using stack: Q=(A+B*C*(M*N^P+T)-G+H)	10	CO4	K4
12	Describe how stacks can be made using arrays and linked lists. Explain how to add (push) and remove (pop) items from each type of stack. Discuss the benefits and drawbacks of using arrays versus linked lists for implementing stacks.	10	CO5	K2

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

Course Outcomes	CO1	Analyze the algorithms to determine the time and computation complexity and justify the correctness.
	CO2	Design and implement data structures related to search problems
	CO3	For a given problem of Stacks, Queues and linked list implement and analyze to determine the time and computation complexity.
	CO4	Understand logic behind various sorting algorithms and compute the time complexity
	CO5	Learn and implement Graph search and traversal algorithms and determine the time and computation complexity.

GRAPHICAL REPRESENTATION





18/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Program	Computer Science Engineering	Program	Diploma
Subject Name	Algorithms	Semester	III
		Year	January, 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 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 Mark from Q1-i to xii) – 12 Marks

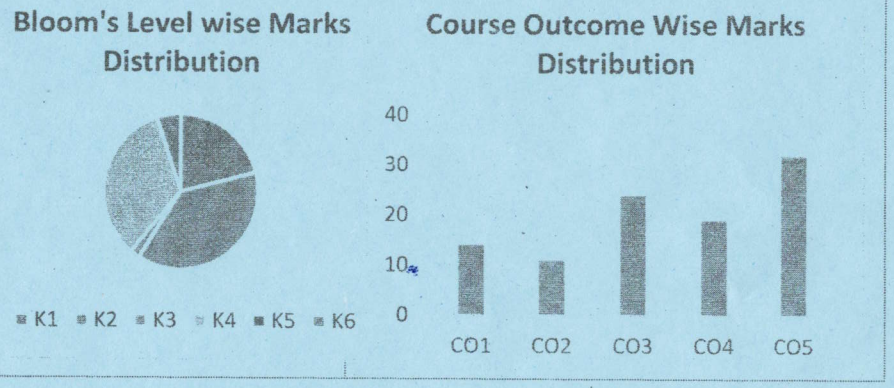
Q. N 1	QUESTIONS	Marks	COs	KL
i	Define a programming model and give one example.	01	CO1	K1
ii	What is data abstraction in the context of programming?	01	CO2	K1
iii	Define a set and differentiate it from a multiset.	01	CO2	K1
iv	What is a stack? How does it differ from a queue?	01	CO3	K1
v	Explain asymptotic analysis in the study of algorithms.	01	CO1	K3
vi	Define the worst-case time complexity of an algorithm.	01	CO1	K3
vii	What is the sorting problem in computer science?	01	CO4	K2
viii	Define bubble sort and state its time complexity in the worst case.	01	CO4	K3
ix	What is a binary search tree (BST)?	01	CO4	K1
x	Define a hash table and mention one advantage of using it.	01	C04	K1
xi	Define a directed graph and an undirected graph.	01	CO5	K2
xii	What is a spanning tree in the context of graph theory?	01	CO5	K1

Section B (Answer any FOUR out of SIX) – 28 Marks (Each question Carry 07 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the concept of data abstraction in object-oriented programming. How does it improve software design and implementation?	07	CO1	K3
3	Discuss the differences between sets and multisets. In which scenarios would you prefer using a multiset?	07	CO2	K4
4	Compare and contrast stacks and queues in terms of their data structures, operations, and practical applications. Provide examples where each is useful.	07	CO3	K4
5	What is asymptotic analysis of algorithms?	07	CO1	K2
6	What are hash tables, and how do they work? Explain collision resolution strategies, such as chaining and open addressing.	07	CO4	K2
7	Explain how Tries (prefix trees) are used for efficient string searching. Discuss their structure and advantages in applications like autocomplete or dictionary lookup.	07	CO5	K3
Section C (Answer any TWO out of FOUR) – 30Marks (Each question Carry 15 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the various types of programming models (e.g., imperative, object-oriented, functional, declarative). Compare their strengths and weaknesses with suitable examples.	15	CO2	K5
9	Compare the performance of Quick Sort and Merge Sort in terms of their time complexity, space complexity, and application in different scenarios. Also write Algorithm for Quick and Merge Sort.	15	CO4	K2
10	Explain how balanced search trees (like AVL trees) are different from simple binary search trees. Discuss how balancing improves search performance.	15	CO5	K4
11	Discuss Dijkstra's algorithm for finding the shortest path in a graph. Explain how it works and its limitations.	15	CO5	K3

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

Course Outcomes	CO1	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
	CO2	For a given Search problem student will able to implement it.
	CO3	For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
	CO4	Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
	CO5	Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

GRAPHICAL REPRESENTATION



21/01/25

ARKA JAIN University, Jharkhand — NAAC GRADE A			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science & Engineering	Program	Diploma
Subject Name	Computer Programming	Semester	III
		Year	January, 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)

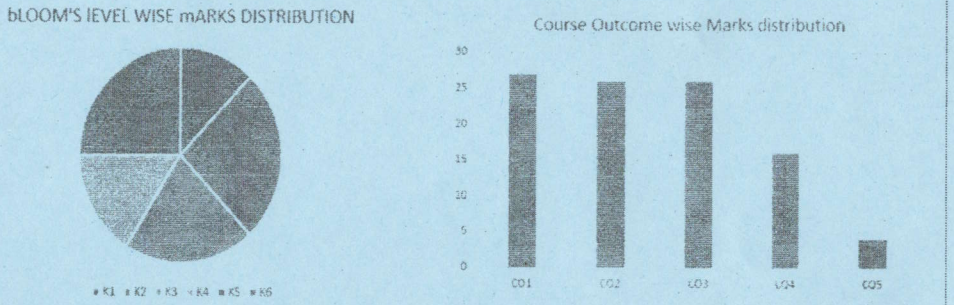
Q. N 1	QUESTIONS	Marks	COs	KL
i	What is computer? What are the input and output devices?	2	CO[1]	K1
ii	Which are different data types available in C?	2	CO[2]	K2
iii	What is an array?	2	CO[3]	K2
iv	Write example of relational operator.	2	CO[3]	K3
v	Why a string is required? How to declare it?	2	CO[5]	K3
vi	What is function? How many types of functions are there?	2	CO[5]	K4
vii	Why we use a loop? Write the syntax of for loop.	2	CO[4]	K4
viii	What is pre increment and post increment operator?	2	CO[3]	K4
ix	What is a variable in C?	2	CO[2]	K2
x	What is recursion? Give example.	2	CO[4]	K3

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 in C to determine a number is even or Odd.	05	CO[4]	K6
3	Write the structure of a nested if-else statement.	05	CO[4]	K4
4	How a single dimensional and two dimensional array is declared and initialized? Give example.	05	CO[3]	K3
5	What are the various functions available in string. h header file?	05	CO[3]	K2
6	What is an operator? Give example of arithmetic and logical operator?	05	CO[1]	K2
7	What is the difference between local and global variable in C?	05	CO[2]	K4
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	With a neat diagram explain the basic structure of a computer.	10	CO[1]	K1
9	Write a program in C to determine sum of digits of a number using for loop.	10	CO[3]	K6
10	Write a short note on function.	10	CO[3]	K3
11	How many data types are there in C? Explain.	10	CO[2]	K2
12	Write a program in C to add two matrices.	10	CO[1]	K6

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

Course Outcomes	CO1	Makes students gain a broad perspective about the uses of computers in engineering industry.
	CO2	Develops basic understanding of computers, the concept of algorithm and algorithmic thinking.
	CO3	Develops the ability to analyze a problem, develop an algorithm to solve it.
	CO4	Develops the use of the C programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general
	CO5	Introduces the more advanced features of the C language

GRAPHICAL REPRESENTATION



23/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END TERM EXAMINATION School of Engineering & IT
Branch	Computer Science & Engineering	Program	Diploma
Subject Name	Computer System & Organization	Semester	III
		Year	January, 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 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
i	Compare SRAM and DRAM.	2	CO3	K1
ii	Discuss the use of bus in computer architecture.	2	CO5	K2
iii	Why do we use flip flops?	2	CO4	K1
iv	Draw block diagram for micro-operation P : R2 ← R1..	2	CO1	K2
v	What is DMA?	2	CO3	K1
vi	Name any 3 pipeline conflicts.	2	CO1	K2
vii	Name the functional units of a computer.	2	CO4	K1
viii	What is meant by interfacing?	2	CO5	K1
ix	Name all the addressing modes.	2	CO2	K2
x	Elaborate the terms: CISC, RISC, EEPROM	2	CO4	K1

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Draw and explain the Von Neuman Architecture.	5	CO1	K6
3	How does CPU perform the multiplication of digital numbers?	5	CO4	K5
4	Analyse the hazards of pipelining.	5	CO3	K6
5	Draw a block diagram of a Computer's ALU showing all the components.	5	CO1	K6
6	What is associative memory? Explain with proper diagram.	5	CO2	K6
7	What is parallel processing? Explain the creation of instruction pipelining.	5	CO1	K6

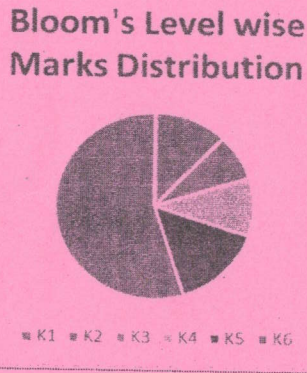
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

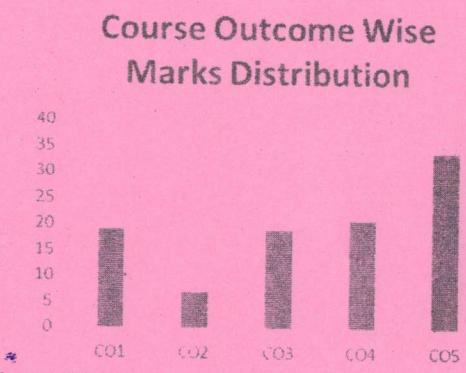
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain memory hierarchy with proper diagram. Analyse each level of the hierarchy in terms of time, capacity and cost. Give reason why cache is used?	10	CO5	K6
9	Explain Flynn's taxonomy in detail.	10	CO3	K6
10	What is cache memory? Explain direct cache mapping technique with proper diagram.	10	CO4	K5
11	What is parallelism? Explain various types of parallelism in details.	10	CO5	K4
12	Explain the difference between memory-mapped I/O and isolated I/O. What are the advantages and disadvantages of each approach?	10	CO5	K6

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

Course Outcomes	CO1	Explain the organization of basic computer, its design, and control unit.
	CO2	Demonstrate the working of central processing unit, CISC and RISC architecture.
	CO3	Describe the operations and language for the register transfer, micro operations, input-output organization.
	CO4	Understand the organization of memory and memory management hardware.
	CO5	Understand the basics of hardwired and micro-programmed control of CPU

GRAPHICAL REPRESENTATION





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JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science and Engineering	Program	Diploma
Subject Name	Python Programming	Semester	III
		Year	January, 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)

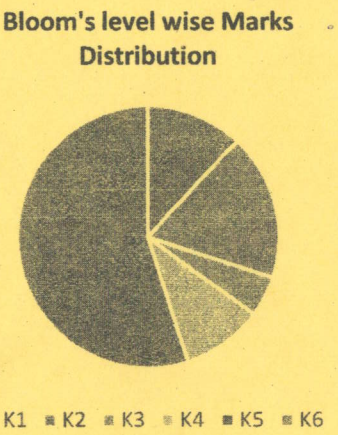
Q. N 1	QUESTIONS	Marks	COs	KL
i	Define Python List.	2	CO1	K1
ii	What is a function?	2	CO1	K1
iii	What are the different types of files handled by Python?	2	CO1	K2
iv	Write down four features of Python Language.	2	CO1	K1
v	List the mutable data types and immutable data types.	2	CO1	K2
vi	What do you mean by Django framework?	2	CO3	K1
vii	List any two type of search functions used in regular expression.	2	CO2	K1
viii	What is the difference between local and global variable.	2	CO1	K2
ix	Which function is used to know the data type of a variable?	2	CO1	K1
x	Write down various search methods provided by regular expression module.	2	CO1	K2

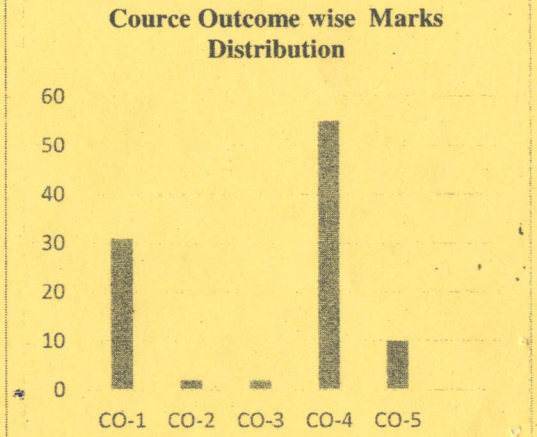
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	**QUESTIONS**	**Marks**	**COs**	**KL**
2	Write a recursive function to print the factorial of a given number.	05	CO4	K6
3	Describe the different access modes of the files with an example.	05	CO4	K3
4	Write a program to swap two numbers without using third variable.	05	CO1	K6
5	Write a program to determine whether a number is Strong or not.	05	CO1	K6
6	Write a Python function to calculate the area of a circle.	05	CO1	K6
7	Write a program to find the sum of the digits of a number.	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	Create a Python text file to perform read and write operations.	10	CO4	K6
9	Describe all the data types supported in Python Programming.	10	CO4	K2
10	Explain Django's architecture.	10	CO5	K4
11	Write a Python program, to print the following patterns: a) 12345 1234 123 12 1 b) 1 10 101 1010 10101	10	CO4	K6
12	Write a Python program to print the Fibonacci series upto n using a recursive function.	10	CO4	K6

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

Course Outcomes	CO1	Demonstrate the basic techniques used to create scripts for automating system administrative tasks.
	CO2	Demonstrate the use of regular expressions in processing text.
	CO3	Construct web scrapping scripts to programmatically obtain data and content from the web pages.
	CO4	Design, code, and test applications using Python scripts.
	CO5	Framework with different scripting language.

GRAPHICAL REPRESENTATION





29/01/25

ARKA JAIN University, Jharkhand — NAAC GRADE A, ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering and IT
Branch	Computer Science Engineering	Program	Diploma
Subject Name	Essence of Indian Knowledge Tradition	Semester	III
		Year	January, 2025
Time: 1.5 Hour Max. Marks : 35	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Five out of Six of Section B** • **Answer Any Two out of Four of Section C** • **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **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	Define Veda.	01	CO1	KL1
ii	Name the Veda associated with bhakti and kirtan.	01	CO2	KL4
iii	How many hymns are there in Rig Veda?	01	CO1	KL2
iv	Is Agriculture a type of traditional knowledge?	01	CO3	KL5
v	In which Veda, God Agni is worshipped.	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	Give two characteristics of Indian Knowledge System.	02	CO1	KL2
3	What is the role of Modern Science in Indian Knowledge System?	02	CO2	KL1
4	Which veda is associated with study of herbs and medicine?	02	CO3	KL3
5	Name the veda known as the knowledge of verses.	02	CO3	KL2
6	Give two differences between 'Veda and Upveda'	02	CO2	KL5

7	State 2 benefits of Ayurveda.	02	CO3	KL4

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Ashtadasa Vidya is also known as 'Eighteen Sciences'. Elaborate.	10	CO1	KL1
9	What is Yoga? Explain any of its two asanas.	10	CO2	KL2
10	Explain all the vedangas.	10	CO1	KL5
11	Differentiate between: Gandharva Veda and Arthashashtra Veda	10	CO2	KL5

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

Course Outcomes	CO1	Basic principles of thought process, reasoning and differencing.
	CO2	Introduction to the Indian Knowledge Systems, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care systems.
	CO3	Focus on Indian philosophical traditions, Indian linguistic tradition and Indian artistic tradition.

GRAPHICAL REPRESENTATION