

CO- Course Outcomes,

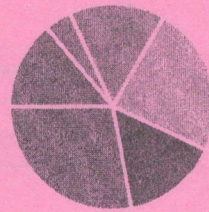
KL- Knowledge Level,

PO – Program Outcome

CO1	Identify special features introduced in C++ when compared to C and illustrate the difference between structure and class using C++ program.
CO2	Apply the Concepts of inheritance, polymorphism for the given problem and develop C++ program.
CO3	Implement the concept of overloading, default parameters, Constructors and destructors in a C++ program.
CO4	Analyze the working of I/O operations with C++ files.
CO5	Analyze the working of I/O operations with C++ files.
CO6	Demonstrate the concepts of data abstraction, information hiding and encapsulation by writing C++ program.

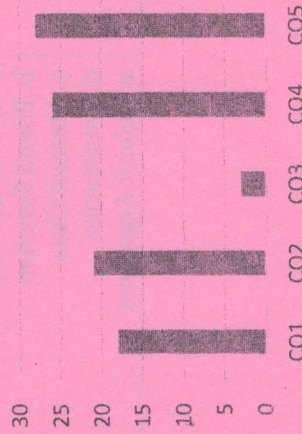
**GRAFICAL REPRESENTATION**

**Bloom's Level wise Marks Distribution**



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

**Course Outcome Wise Marks Distribution**



**ARKAJAIN University**  
Jharkhand

**END TERM EXAMINATION**  
School of Engineering & IT

Branch	CS& IT	Program	MCA
Subject Name	Basics of Programming Languages	Semester	1st
		Year	2023/Odd
Time: 3 Hour Max. Marks: 70	<ul style="list-style-type: none"> <li>Start writing from 2nd page onwards; don't Write on the 1st Page Backside</li> <li>Answer all Questions of Section A (Compulsory)</li> <li>Answer Any Four out of Six of Section B</li> <li>Answer Any Three out of Five of Section C</li> <li>Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Papers.</u></li> </ul>		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

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

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	What are the different keywords used to handle the exception?	2	CO1	K1	PO2
ii	What is parameterized constructor? Explain with the help of program.	2	CO4	K4	PO5
iii	Explain the concept of Array.	2	CO3	K2	PO4
iv	What is the use of pointer? Explain	2	CO5	K1	PO2
v	Explain about the concept of Object with the help of example.	2	CO2	K1	PO5
vi	What is the use of New operator?	2	CO5	K2	PO7
vii	Explain the concept of friend Function.	2	CO3	K6	PO9
viii	Explain the concept of GOTO statement?	2	CO5	K4	PO6
ix	What is Destructor? Explain the concept with the help of program.	2	CO5	K2	PO8
x	What is Library functions?	2	CO3	K1	PO5

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

(Each question 5 Marks)

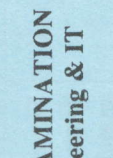
Q. No.	QUESTIONS	Marks	COs	KL	PO
2	What is nested structure? Explain the concept of nested structure with the help of program.	5	CO3	K4	PO2
3	Write a program to take input of name, rollno and marks obtained by a student in 4 subjects of 100 marks each and display the name, rollno with percentage score secured.	5	CO4	K4	PO2
4	Define Inheritance? List out the different types of inheritance with its concept?	5	CO7	K4	PO2
5	Write a program to print day name using switch case statement.	5	CO2	K2	PO2
6	Write a program in to display the Pattern 1 1 2 1 1 2 3 2 1 1 2 3 4 3 2 1 1 2 3 4 5 4 3 2 1	5	CO1	K3	PO2
7	Write a program to calculate simple and compound interest.	5	CO5	K4	PO2

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

(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Write a C program to find the factorial of a given integer by using recursive and non-recursive functions.	10	K4	PO5	CO4
9	How to pass arguments to a function? Explain the concept of call by value and call by reference with the help of program.	10	K5	PO7	CO2
10	Create a base class shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data() to initialize base class data member and another member function display_area() as a virtual function and redefine this function in the derived class to suit	10	K5	PO9	CO3

11	<p>their requirements. Using these three classes, design a program that will accept dimensions of a rectangle or a triangle interactively and display the area. Remember the two values given as input will be treated as length of two sides in case of rectangle and base and height in case of triangles.</p> <p>An electricity board charges the following rates to domestic users to discourage large consumption of energy.</p> <table border="0"> <tr> <td>Units Consumed</td> <td>Charge</td> </tr> <tr> <td>Upto 100 units</td> <td>₹1.50 per unit</td> </tr> <tr> <td>For next 200 units</td> <td>₹3.00 per unit</td> </tr> <tr> <td>More than 300 units</td> <td>₹5.00 per unit</td> </tr> </table> <p>All the users are charged a minimum of Rs. 100. If the total cost exceeds Rs.250, then an additional charge of 15% is added. Write a program to read the names of the user and number of units consumed and print out the charges with names.</p>	Units Consumed	Charge	Upto 100 units	₹1.50 per unit	For next 200 units	₹3.00 per unit	More than 300 units	₹5.00 per unit	10	K6	PO1 1	CO5
Units Consumed	Charge												
Upto 100 units	₹1.50 per unit												
For next 200 units	₹3.00 per unit												
More than 300 units	₹5.00 per unit												
12	<p>Define the Following: -</p> <ol style="list-style-type: none"> <li>Classes and Object</li> <li>Friend Function</li> <li>Abstract Class</li> <li>Constructor</li> <li>Default Argument</li> </ol>	10	K2	PO2	CO6								


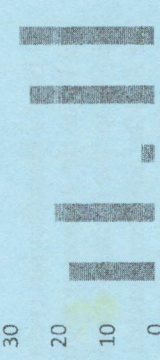
		<b>END TERM EXAMINATION</b> School of Engineering & IT	
Branch	CS & IT	Program	MCA
Subject Name	Discrete Mathematics	Semester	Ist
		Year	2023/ Odd
Time: 3 Hour Max. Marks : 70	<ul style="list-style-type: none"> <li>Start writing from 2nd page onwards; don't Write on the 1st Page Backside</li> <li>Answer all Questions of Section A (Compulsory)</li> <li>Answer Any Four out of Six of Section B</li> <li>Answer Any Three out of Five of Section C</li> <li>Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will come under Unfair Means and will Result in the Cancellation of the Papers.</li> </ul>		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating
<b>Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks</b>			
Q. N 1	QUESTIONS		Marks
i	Every pair of vertices in a graph is an edge, so a path of length n is a sequence of ___ vertices?	CO5	2
ii	A relation R from A to B is given by $R = \{(1, a), (1, b), (3, a), (3, b), (5, c)\}$ . What is the minimum possible number of ordered pairs in $A \times B$ ?	CO1	2
iii	If $A = \{a, b, c, d\}$ and the function $f = \{(a, b), (b, d), (c, a), (d, c)\}$ , write $f^{-1}$	CO1	2
iv	G is a simple undirected graph. Some vertices of G are of odd degree. Add a node v to G and make it adjacent to each odd degree vertex of G. The resultant graph is sure to be _____.	CO5	2
v	A personal computer has the length of time between charges of the battery is normally distributed with a mean of 66 hours and a standard deviation of 20 hours. What is the probability when the length of time will be between 58 and 75 hours?	CO2	2
vi	How many gates would be required to implement the following Boolean expression after simplification? $XY + X(X + Z) + Y(X + Z)$	CO2	2
		CO5	PO1 0

11	i) A box contains 4 chocobars and 4 ice creams. Tom eats 3 of them one after another. What is the probability of sequentially choosing 2 chocobars and 1 icecream? ii) In a group of 60 employees, 32 like pizza and 38 like burgers, and each employee likes at least one of the two snacks. Find how many employees like both pizza and burgers?	10	CO2	K3	PO5
12	Suppose that in a group of 5 people: A, B, C, D, and E, the following pairs of people are acquainted with each other. <ul style="list-style-type: none"> <li>A and C</li> <li>B and C</li> <li>C and E</li> </ul> a) Draw a graph G to represent this situation. b) List the vertex set, and the edge set, using set notation. In other words, show sets V and E for the vertices and edges, respectively, in $G = \{V, E\}$ . c) Draw an adjacency matrix for G.	10	CO4	K5	PO4

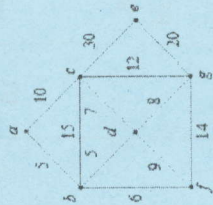
**CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome**

Course Outcomes	<p>CO.1 Apply the operations of sets and use Venn diagrams to solve applied problems; solve Problems using the principle of inclusion-exclusion</p> <p>CO.2 Apply rules of inference, proof by contradiction, proof by cases, and write proofs Using symbolic logic and Boolean algebra</p> <p>CO.3 Solve counting problems by applying elementary counting techniques using the Product and sum rules, permutations, combinations, Course the pigeon-hole principle</p> <p>CO.4 Determine if a given graph is simple or a multigraph, directed or undirected, cyclic or acyclic, and determine the connectivity of a graph.</p> <p>CO.5 Understand the basic principles of sets and operations in sets.</p> <p>CO.6 Demonstrate an understanding of relations and functions and be able to determine their properties.</p>
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**GRAFICAL REPRESENTATION**

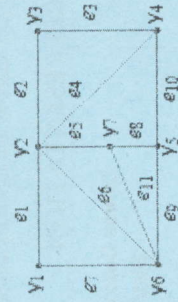
<b>Bloom's Level wise Marks Distribution</b>	<b>Course Outcome Wise Marks Distribution</b>
 <p>■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6</p>	 <p>■ CO1 ■ CO2 ■ CO3 ■ CO4 ■ CO5</p>

vii	How many ways are these to select five players from 10 member tennis team to make a trip to match to another school.	2	CO3	K2	PO1
viii	Let the statement be "If n is not an odd integer then sum of n with some not odd number will not be odd.", then if P(n) is "n is an not an odd integer" and Q(n) is "sum of n with some not odd number will not be odd." A proof by contraposition will be	2	CO1	K3	PO5
ix	What is Euler graph?	2	CO4	K5	PO4
x	_____ sets are smallest sets of edges from the graph so that removing the set disconnects the graph, but removing any appropriate subset leaves it connected.	2	CO3	K5	PO3
<b>Section B (Answer any FOUR out of SIX) - 20 Marks</b> (Each question 5 Marks)					
Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Show that $\neg(p \leftrightarrow q) \equiv (p \vee q) \wedge \neg(p \wedge q)$ without constructing the truth table.	5	CO1	K2	PO1
3	Let $A = [-1, 1]$ . Then, discuss whether the following functions defined on A are one-one, onto or bijective.	5	CO1	K3	PO5
4	Let the functions $f1 a, b, c = \sum 1, 2, 3, 4$ and $f2 a, b, c = \sum 0, 2, 4, 6$ . What is $f1 \oplus f2$ ?	5	CO2	K5	PO4
5	If $f: R \rightarrow R$ is defined by $f(x) = x^2 - 3x + 2$ , find $f(f(x))$	5	CO1	K5	PO3
6	From a committee consisting of 6 men and 7 women in how many ways can be select a committee of i) 3 men and 4 women. ii) 4 members which has at least one women.	5	CO3	K5	PO1 0
7	In the following graph the vertices represent cities and the numbers on the edges represent the costs of building the indicated roads. Find a least-expensive road system that connects all the cities.	5	CO4	K2	PO1



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

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	There are 2500 student in a college of these 1700 have taken a course in C, 1000 have taken a course pascal and 550 have taken course in networking. Further 750 have taken course in both C and pascal, 400 have taken courses in both C and Networking and 275 have taken courses in both pascal and networking. If 200 of these student have taken course in C pascal and Networking. i) How many these 2500 students have taken a courses in any of these three courses C, pascal and networking? ii) How many of these 2500 students have not taken a courses in any of these three courses Pascal and networking?	10	CO 3	K5	PO 3
9	Is $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ a function? If g is described by $g(x) = \alpha x + \beta$ , then what value should be assigned to $\alpha$ and $\beta$ ?	10	CO 1	K5	PO 10
10	Write whether the path $(v2, v3, v4, v2, v6, v1, v2)$ in the graph is a simple path, a cycle, a simple cycle, or none of these.	10	CO 5	K2	PO 1



- i) Find a Hamiltonian cycle in this graph.
  - ii) Write the adjacency matrix of this graph.
  - iii) Write the incidence matrix of this graph.
- If A is the adjacency matrix of this graph, what does the entry in row v2 and column v3 of A3 represent?