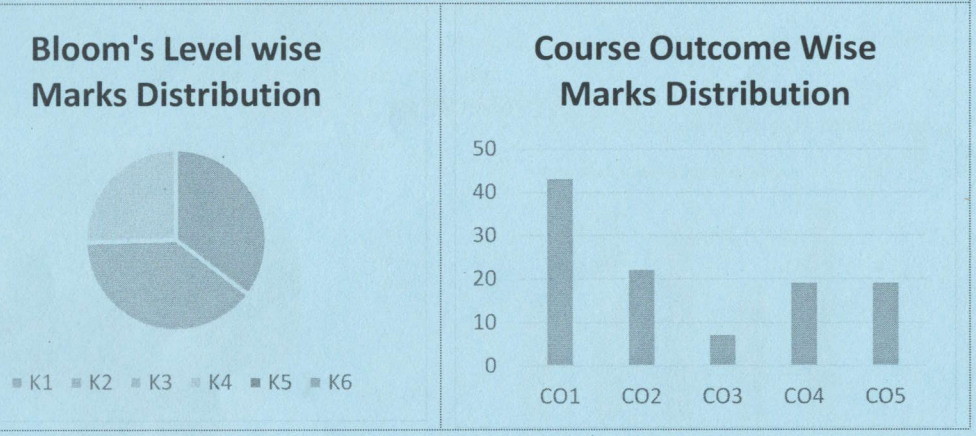
CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Describe the various application layer protocols used by TCP/IP reference model
	CO2	Differentiate between connection oriented and connection less services of transport layer
	CO3	Solve problems of routing using various routing protocols and algorithms
	CO4	Illustrate access control protocols of data link layer
	CO5	Identify issues related to wireless networks, cellular networks and mobility in Internet

GRAFICAL REPRESENTATION



JGI ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	Computer Science and Engineering	**Program**	M. Tech
Subject Name	Advances in Computer Network	**Semester**	1
		Year	Feb/2024

Time: 3 Hour
Max. Marks : 70

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
- **Answer Any Three out of Five of Section C**
- **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.

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

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

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	ARPANET stands for? a) Advanced Research Project Agency Network b) Advanced Research Project Automatic Network c) Advanced Research Programmed Auto Network d) Advanced Research Project Authorized Network	2	CO1	K1	PO2
ii	What was the name of first Computer Network? a) MAC b) SNoBolL c) ARPANET d) None	2	CO1	K2	PO1
iii	POP stands for? a) Post Office Protocol b) Pre Office Protocol c) Protocol Of Post d) None	2	CO4	K2	PO5
iv	Port no. of POP is? a) 110 b) 43 c) 48 d) 25	2	CO3	K4	PO1
v	How many layers are in the OSI model? a) 1 layer b) 3 layers c) 5 layers d) 7 layers	2	CO1	K1	PO1
vi	OSI stands for_____ ? a) Open System Interconnection b) Operating System Interface c) Optical Service Implementation d) Open Service Internet	2	CO1	K2	PO1

vii	Which layer provides the services to user? a) Physical layer b) Session layer c) Application layer d) Presentation layer	2	CO4	K4	PO4
viii	HUB is a? a) Calculating device b) Network device c) Computing device d) Software	2	CO5	K2	PO5
ix	Which of the following is required to host web site? a) Web Server b) Mail Server c) Database Server d) Exchange Server	2	CO5	K4	PO5
x	Set of rules defines? a) FTP b) IMAP c) SMTP d) Protocol	2	CO2	K2	PO1

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Describe in detail the differences between TCP and UDP?	5	CO1	K1	PO2
3	What is the use of Multiplexing and Demultiplexing, explain with an example?	5	CO4	K2	PO5
4	How World Wide Web works?	5	CO1	K2	PO1
5	What is DNS and briefly explain name spaces used by it?	5	CO5	K4	PO1
6	How congestion control is performed in TCP?	5	CO1	K1	PO2
7	How admission control and traffic shaping helps in improving QoS?	5	CO3	K4	PO4

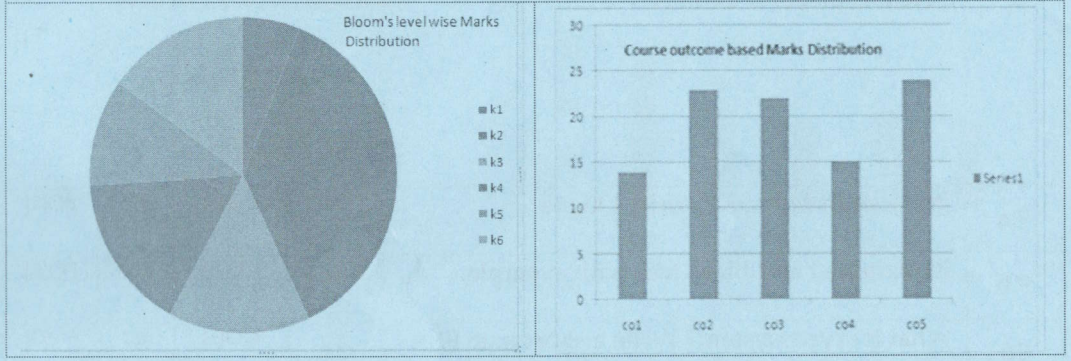
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Explain about single-byte and multi-byte options available in IPv4 header.	10	CO2	K1	PO2
9	Explain the protocol Stack Issues in Mobile Computing Environment.	10	CO4	K2	PO5
10	Give the Comparisons of SMTP and POP3 protocols	10	CO1	K2	PO1
11	State different real-time applications of Ad-hoc networks.	10	CO5	K4	PO1
12	Draw and explain OSI Model with different layers	10	CO1	K1	PO2

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

Course Outcomes	CO1	Devise recurrence relations and amortized cost of various operations..
	CO2	Illustrate graph algorithms such as Bellman-Ford, Shortest path, bipartite matching, B-trees, Red-Black trees and hashing techniques..
	CO3	Identify the methods for solving modular linear equations, Chinese remainder theorem and RSA cryptosystem, types of heaps such as Binomial and Fibonacci heaps.
	CO4	Assess the string matching algorithms such as Boyer-Moore and Knuth-Morris-Pratt algorithm.
	CO5	Compose mathematical models, objective functions and constraints to solve algoritshmic puzzles

GRAFICAL REPRESENTATION



JGI ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	**Computer Science & Engineering**	**Program**	**M.Tech**
Subject Name	**Advanced Algorithms**	**Semester**	**I**
		Year	**Feb/2024**

Time: 3 Hour
Max. Marks : 70

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
- **Answer Any Three out of Five of Section C**
- **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.

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

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

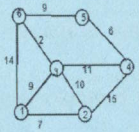
Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	What is the worst case time complexity of a quick sort algorithm on an input array of N numbers? a. O(N) b. O(N Log N) c. O(N^2) d. O(log N)	2	CO [1]	K1	PO [2]
ii	Which of the following algorithm can be used to efficiently calculate Single Source Shortest path in a Directed Acyclic Graph? a. Dijkstra b. Bell Man ford c. Topological Sort d. Strongly Connected Component	2	CO [2]	K4	PO [3]
iii	Which collision resolution technique involves maintaining a linked list of collided keys? a. Linear Probing b. Quadratic Probing c. Chaining d. double Hashing	2	CO [2]	K1	PO [1]
iv	What is the time complexity of Build Heap operation? a. O(N log N) b. O(N^2) c. O(N) d. O(log N)	2	CO [3]	K2	PO [2]
v	Time Complexity of Breadth First Search is?. a. O(V + E) b. O(V) c. O(E) d. O(V*E)	2	CO [2]	K1	PO [1]

vi	The number of colors used by a proper coloring graph is called? a. K coloring graph b. X coloring graph c. M coloring graph d. N coloring graph	2	CO [2]	K4	PO [1]
vii	What is a Rabin and Karp Algorithm? a. String Matching Algorithm b. Shortest Path Algorithm c. Minimum spanning tree Algorithm d. Approximation Algorithm	2	CO [1]	K5	PO [2]
viii	What is the basic principle in Rabin Karp algorithm? a. Hashing b. Sorting c. Augmenting d. Dynamic Programming	2	CO [5]	K5	PO [2]
ix	Find the O-notation for the following function. $f(n)=4n^3+2n+3$ a. O(n^3) b. O(n^2) c. O(n^4) d. O(n)	2	CO [1]	K5	PO [2]
x	Determine the value of a2 for the recurrence relation an = 17an-1 + 30n with a0=3. a. 4387 b. 5484 c. 238 d. 1437	2	CO [5]	K3	PO [2]

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain Bionomial Heap.	5	CO[3]	K4	PO[2]
3	Write a Recursive Function to determine the factorial of a number.	5	CO[1]	K3	PO[2]
4	Write algorithm for solving the problem of sorting 5 with max of 7 comparison.	5	CO[5]	K6	PO[2]
5	What is a string? Explain the concept of string matching algorithm.	5	CO[4]	K3	PO[2]
6	Define Path, cycle and Plannar graph with appropriate diagram.	5	CO[2]	K2	PO[1]
7	Explain recurrence tree with example.	5	CO[1]	K2	PO[4]

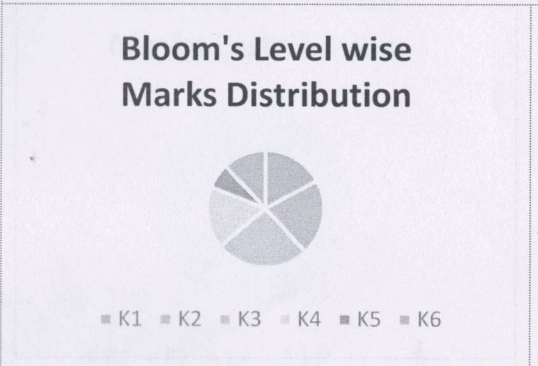
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

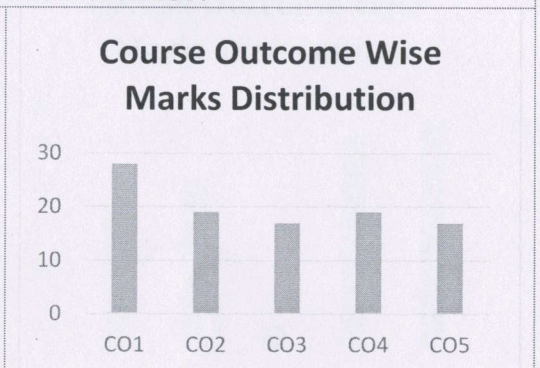
Q. No.	QUESTIONS	Marks	COs	KL	PO
8.a	Explain Rehashing and Chaining with example.	5	CO[2]	K3	PO[2]
8.b	Find single source (1) shortest path for the given graph using Dijkstra's Algorithm. 	5	CO[2]	K5	PO[2]
9.a	Write short note on Priority Queue.	4	CO[3]	K2	PO[2]
9.b	Explain Red and Black tree with example.	6	CO[3]	K2	PO[3]
10	What is cryptosystem? Write a short note RSA cryptosystem.	10	CO[3]	K2	PO[3]
11.a	Solve N Queens Problem. Write the backtracking algorithm for solving N Queens's problem.	7	CO[5]	K6	PO[3]
11.b	Show the state space tree for 4 Queens problem.	3	CO[5]	K6	PO[3]
12	How Rabin – Karp algorithm is applied for string matching.	10	CO[4]	K4	PO[4]

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

Course Outcomes	CO1	Understand different database models and the overview of relation database Model
	CO2	Understand the different query languages and systems.
	CO3	Analyze the concepts of indexing and hashing.
	CO4	Apply the query processing and optimization to databases
	CO5	Analyze the processing the queries in distributed and parallel databases

GRAFICAL REPRESENTATION





JGI ARKAJAIN University Jharkhand			**END TERM EXAMINATION** **School of Engineering & IT**
Branch	**Computer Science and Engineering**	**Program**	**M.Tech**
Subject Name	**Data Base Modelling and Design**	**Semester**	**1**
		Year	**Feb/2024**
Time: 3 Hour Max. Marks : **70**	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any Three out of Five of Section C** • **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will 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

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

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	What is the best way to represent the attributes in a large database?	2	CO1	K1	PO1
ii	What is Relational Calculus?	2	CO2	K2	PO2
iii	What is Denormalization?	2	CO3	K3	PO3
iv	What is Functional Dependency?	2	CO2	K3	PO2
v	List the ACID properties of a transaction	2	CO4	K2	PO3
vi	Define the term file organization	2	CO1	K4	PO1
vii	Define Data mining	2	CO1	K6	PO2
viii	What are the issues in data warehouse design?	2	CO5	K2	PO3
ix	List the advantages of the database system	2	CO4	K3	PO2
x	What is dynamic hashing?	2	CO1	K5	PO1

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	What is an entity relationship model?	5	CO1	K1	PO2

3	What are aggregate functions? And list the aggregate functions supported by SQL?	5	CO3	K2	PO1
4	What are the two methods for dealing deadlock problem?	5	CO4	K5	PO3
5	How concurrency is performed? Explain the protocol that is used to maintain the concurrency concept.	5	CO2	K4	PO1
6	Describe the different types of file organization. Explain using a sketch of each of them with their advantages and disadvantages.	5	CO1	K3	PO2
7	What is versioning in terms of an object-oriented database?	5	CO5	K3	PO3

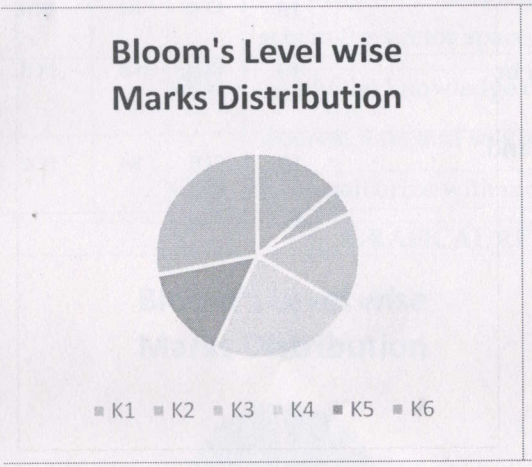
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

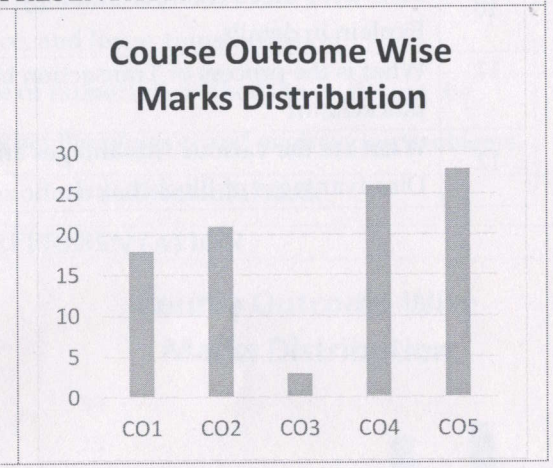
Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Mention the purpose of indexing. How can this be done by the B+ tree?	10	CO1	K1	PO1
9	Explain briefly the working of a two-phase locking protocol using a sample transaction.	10	CO3	K3	PO2
10	Compute the closure (F+) of the following set functional dependencies for the relational schema R = (A, B,C,D,E) , and F ={A– > BC– > E,B– > D,E– > A}. List the candidate keys for R	10	CO4	K6	PO3
11	Construct an ER diagram for a hospital management system with a set of patients and a set of doctors. Associate with each patient a log of the various tests and examinations conducted.	10	CO2	K2	PO2
12	Briefly write the overall process of Multidimensional and Parallel distributed databases system.	10	CO5	K4	PO3

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

Course Outcomes	CO1	Understand the basics of block chain technology
	CO2	Analyse the different technologies of block chain
	CO3	Describe the abstract models of block chain
	CO4	Apply the smart contract languages and verification languages
	CO5	Develop the block chain technology on different applications

GRAFICAL REPRESENTATION





JGi ARKAJAIN University Jharkhand			**END TERM EXAMINATION** **School of Engineering & IT**
Branch	**Computer Science and Engineering**	**Program**	**M.Tech**
Subject Name	**Block chain Technology**	**Semester**	**I**
		Year	**Feb/2024**
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any Three out of Five of Section C** • **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers**.		
Knowledge Level (KL)	**K1 :** Remembering	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

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

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Blockchain is a peer-to-peer _____ distributed ledger technology that makes the records of any digital asset transparent and unchangeable. a. Decentralized b. Demanding c. Secure d. Popular	2	CO1	K1	PO2
ii	Bitcoin is a crypto currency, which is an application of Blockchain. a. True b. False	2	CO4	K3	PO1
iii	What does P2P stand for? a. Peer to Peer b. Product to Product c. Password to Password. d. None of the above	2	CO5	K2	PO5
iv	Blockchain has ____ versions. a. 2 b. 3 c. 4 d. 5	2	CO3	K2	PO1

v	Who introduced the digital online cryptocurrency known as Bitcoin? a. Satoshi Nakamoto b. Nick Szabo c. Wei Dai d. Hal Finney	2	CO4	K4	PO3
vi	What does a block in a Blockchain have? a. Header & Digital ledger b. Bitcoins & Input c. Transactions & Bitcoins d. Header & Transaction	2	CO1	K5	PO1
vii	What is the genesis block? a. Any block created by the founder b. The last block created in the Blockchain c. The first block of a Blockchain d. The first transaction in each block	2	CO2	K2	PO5
viii	Bitcoin is based on _____ blockchain. a. Private b. Public c. Public Permissioned d. Permissioned	2	CO3	K3	PO2
ix	A popular public-private key implementation known as Rivest-Shamir Adelman (RSA) algorithm is used for the Bitcoin and Ethereum Blockchain. a. False b. True	2	CO5	K3	PO7
x	What is a DApp? a. A type of cryptocurrency b. A condiment c. A type of blockchain d. A decentralized application	2	CO2	K2	PO1

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

Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain Blockchain Technology in detail.	5	CO1	K6	PO2
3	Explain Genesis Block. What is Consensus Rule in Block chain?	5	CO5	K6	PO5
4	What are the applications of Blockchain? Explain in details.	5	CO4	K5	PO1
5	What are the three different practical symmetric Encryption?	5	CO2	K3	PO1
6	Explain the concept of Bitcoin.	5	CO4	K1	PO3
7	Explain the structure and design of Blockchain.	5	CO1	K2	PO5

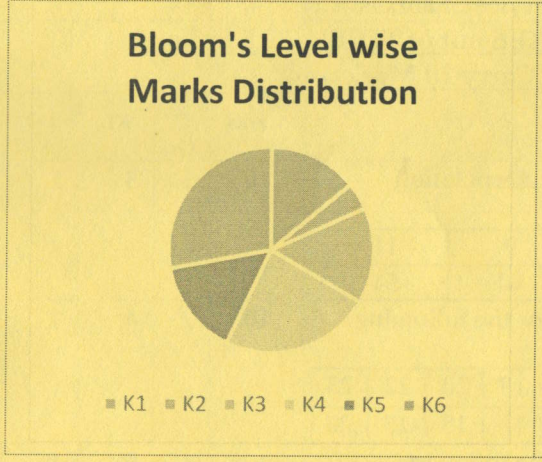
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)

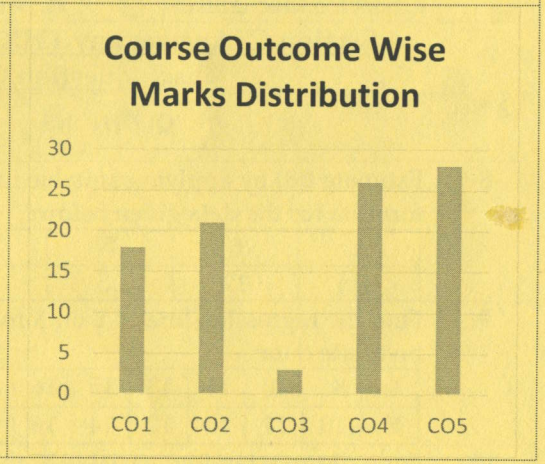
Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Explain the concept of Cryptography and its different types.	10	CO5	K3	PO8
9	Differentiate Between Asymmetric Encryption and Symmetric Encryption.	10	CO5	K1	PO1
10	How does Block chain Technology works? Explain in details.	10	CO2	K2	PO4
11	What is the process of Transaction in Blockchain?	10	CO4	K3	PO5
12	What are the various Advantages and Disadvantages of Blockchain?	10	CO1	K4	PO2

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

Course Outcomes	CO1	Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing area and volume.
	CO2	Understand the applications of vector calculus refer to solenoidal, and irrotational vectors. Orthogonal curvilinear coordinates.
	CO3	Demonstrate the idea of Linear dependence and independence of sets in the vector space, and linear transformation
	CO4	Apply the knowledge of numerical methods in analysing the discrete data and solving the physical and engineering problems.
	CO5	Get familiarize with modern mathematical tools

GRAFICAL REPRESENTATION





ARKAJAIN University Jharkhand

END TERM EXAMINATION
School of Engineering & IT

Branch	**Manufacturing Engineering / Computer Science & Engineering**	**Program**	**M.Tech**
Subject Name	**Advanced Engineering Mathematics and Experimental methods**	**Semester**	**1**
		Year	**Feb/2024**

Time: 3 Hour
Max. Marks : 70

- Start writing from 2nd page onwards; **don't Write on the 1st Page Backside**
- **Answer all Questions of Section A (Compulsory)**
- **Answer Any Four out of Six of Section B**
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Knowledge Level (KL)			
K1 : Remembering	**K3** : Applying	**K5** : Evaluating
K2 : Understanding	**K4** : Analysing	**K6** : Creating

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

Q. N 1	QUESTIONS	Marks	COs	KL	PO
i	Arguments and entries have a. Always an exact relationship b. Usually an approximate relationship c. Always a mathematical relationship d. None of these	2	1	2	1
ii	Which of the following is true? a. $\Delta = E - 1$ b. $\Delta = E + 1$ c. $E = 1 - \Delta$ d. none of these	2	1	1	1
iii	Regression analysis deals with the work of a. Finding approximate relationship between two variables of a bivariate data b. Measuring co variation between two variables of a bivariate data c. Both a and b d. None of these	2	2	2	2
iv	The limits of correlation coefficient is a. 0 to + 1 b. – 1 to 0 c. – 1 to + 1 d. None of these	2	2	1	1

v	In correlation and regression analysis, Spearman's formula is used to find a. Regression coefficient b. Rank correlation coefficient c. Simple correlation coefficient d. None of these	2	2	1	2
vi	For a discrete random variable X with probability mass function p(x), the total probability = $\sum p(x)$, where summation is extended over the entire range of values of X, is a. – 1 b. 0 c. 1 d. None of these	2	3	1	1
vii	In usual notations, n and p are the parameters of a. Binomial distribution b. Poisson's distribution c. Normal distribution d. None of these	2	3	2	2
viii	Designs of Experiment are a. Meant to arrange any experiment in a scientific way b. Practical application of Analysis of Variance technique c. Both a and b d. None of these	2	4	2	2
ix	The analysis of Completely Randomized Design (C. R. D.) resembles with that of a. One-way classification of Analysis of Variance b. Two-way classification of Analysis of Variance c. Three-way classification of Analysis of Variance d. None of these	2	4	1	1
x	A queue consists of persons or articles a. getting service b. waiting for the service c. waiting for the service as well as getting service d. None of these	2	5	1	1

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

Q. No.	QUESTIONS	Marks	C Os	KL	PO
2	The following data is given, prepare difference table: Arguments 4 7 10 13 16 Entries 5 12 20 30 45	5	1	5	1
3	What is correlation? How it is measured?	5	2	2	2
4	Find rank correlation coefficient for the following data: Rank A 1 2 3 4 5 6 7 8 Rank B 3 1 5 7 2 6 8 4	5	2	5	1
5	Define mean and variance of discrete and continuous random variables and give exact formula for each of them in usual notations.	5	3	1	2
6	Explain Randomised Block Design.	5	4	2	2
7	Write notes on any two: a. Queuing b. Balking c. Service Mechanism d. Service Channels	5	5	1	2

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

Q. No.	QUESTIONS	Marks	C Os	KL	PO
8	Estimate f(8) by applying suitable interpolation formula for the data given below: x 6 7 9 11 f(x) 12 25 40 54	10	1	3	1
9	Find the regression line of Y on X for the following bivariate data: X 8 10 11 13 15 16 18 20 22 23 Y 10 11 10 12 14 16 17 18 18 20	10	2	4	1
10	For a discrete random variable X, the following probability distribution is given: x 0 1 2 3 4 5 6 7 P(x) a 2a 3a 4a 5a 6a 7a 8a a) Evaluate the value of a b) Find mean and variance	10	3	5	1
11	Write an essay on Analysis of Variance.	10	4	2	2
12	What is meant by Queuing Models? Explain any one of them.	10	5	2	2