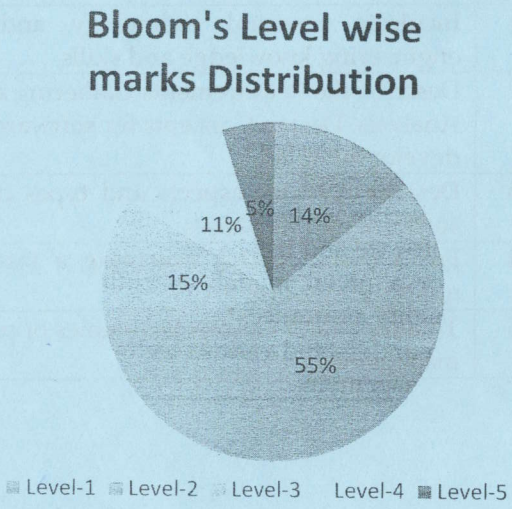
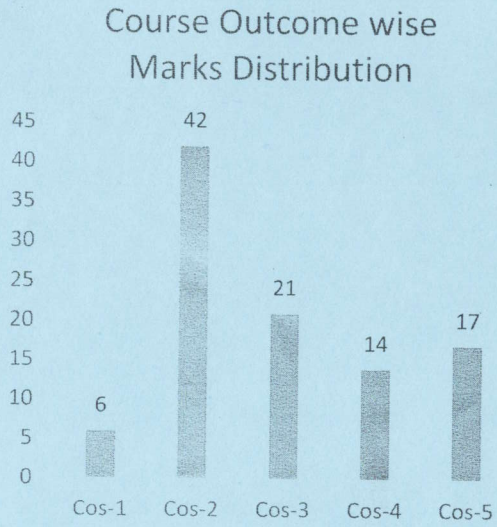




	ARKAJAIN University Jharkhand		END TERM EXAMINATION
Branch	Computer Science & Engineering	Program	POLY
Subject Name	Software Engineering	Semester	IV
Course Code	DIP14207	Year	2022/Even
Time: 3 Hour Maximum Marks : 70	• Start writing from 2nd page onwards; **don't Write On The 1st Page Backside** • **Answer 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 Q1a to Q1j) – 20 Marks

Q. No.1	Questions	Marks	COs	KL	PO
1a.	Explain white box testing.	2	3	2	2
1b.	What are essentials in project management?	2	5	2	5
1c.	What are the characteristics of good SRS document?	2	4	1	3
1d.	Distinguish between verification and validation.	2	3	4	2
1e.	What are the characteristics of software?	2	1	1	6
1f.	What is testing?	2	3	2	2
1g.	What is the importance of Use-case diagram?	2	2	4	8
1h.	Will exhaustive testing guarantee that the program is 100% correct? Explain.	2	1	2	6

1i.	Define maintenance.	2	3	2	2
1j.	Why does software fail after it has passed from acceptance testing?	2	4	4	3

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

Q NO	Questions	Marks	COs	KL	PO
2.	What are the differences between black box and white box testing?	5	2	2	8
3.	Narrate the importance of software specification of requirements.	5	2	3	8
4.	What is effort? What is the need of effort and Project size estimation?	5	2	4	8
5.	Define design. Discuss the characteristics of good design.	5	2	2	8
6.	What is a myth? Give a focus on various software myths regarding Management and Practitioner	5	5	5	5
7.	Explain integration testing process with an example.	5	3	2	2

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

Q NO.	Questions	Marks	COs	KL	PO
8.	Briefly describe the three main types of software maintenance. Why is it sometimes difficult to distinguish between them?	10	3	1	2
9.	What are the generic frame work activities that are present in every software process?	10	5	2	5
10.	Explain the incremental process model with advantages and disadvantages.	10	2	2	8
11.	Explain briefly about project size estimation.	10	2	3	8
12.	Define software engineering. What are the challenges of software engineering?	10	4	2	3

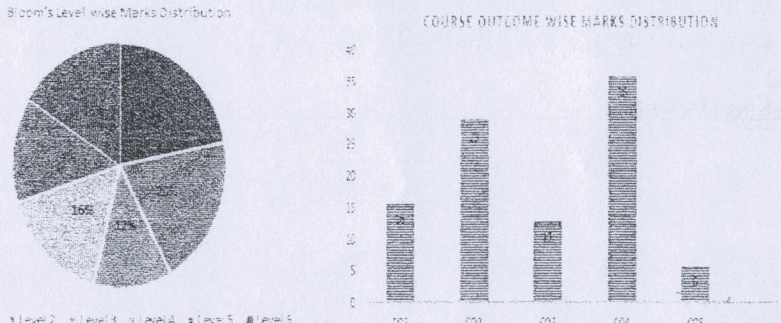
CO- Course Outcomes, KL- Knowledge Level, PO – Program Outcome

Course Outcomes	CO1	Inculcate essential technology and software engineering knowledge and skills
	CO2	Describe the Requirements Gathering and Analysis, Design Concepts for software development
	CO3	Describe various aspects and types of testing a software and its phases.
	CO4	For a given model, executing a test cases for quality assurance
	CO5	To understand various techniques of project management.

11.	Consider the following snapshot of a system: Processes — Allocation A B C — Max A B C — Available A B C P_0 1 1 2 — 4 3 3 — 2 1 0 P_1 2 1 2 — 3 2 2 P_2 4 0 1 — 9 0 2 P_3 0 2 0 — 7 5 3 P_4 1 1 2 — 1 1 2 i. Calculate the content of need matrix. ii. Is the system in a Safe State? If yes, mention the sequence.	**10**	**CO4**	**K6**	**PO9**
12a.	Define seek time and latency time. List two ways of allocating storage and give advantages of each.	**4**	**CO5**	**K3**	**PO2**
12b.	Describe any two: i. Context Switch ii. Shared memory model iii Message Passing model	**6**	**CO2**	**K1**	**PO1**

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

Course Outcomes	CO1	Able to demonstrate basic knowledge about Operating System
	CO2	Develop an understanding of various DOS, Linux commands
	CO3	Able to create a program, process, threads, and execute them
	CO4	Design and implement file management system
	CO5	To understand various types of files and operations on them



	ARKAJAIN University Jharkhand		**END TERM EXAMINATION**
Branch	**Computer Science & Engineering**	Program	**POLY**
Course Name	**Operating System**	Semester	**IV**
Course Code	**DIP14056**	Year	**2022/Even**
Time: 3 Hour Maximum 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 Q1a to Q1j) – 20 Marks

Q. No.1	Questions	Marks	COs	KL	PO
1a.	Define the terms critical section and mutual exclusion.	2	CO2	K1	PO2
1b.	Compare internal and external fragmentation	2	CO4	K2	PO2
1c.	Defend the statement timesharing differ from multiprogramming. If so, how?	2	CO5	K2	PO1
1d.	How does Real time OS differ from Batch OS?	2	CO1	K4	PO1
1e.	List four major activities of an OS with regard to Secondary Storage management.	2	CO1	K1	PO4
1f.	What is context switch and what perception does it generate?	2	CO2	K3	PO1
1g.	Differentiate between internal and external fragmentation.	2	CO2	K2	PO3

1h.	Elaborate the term Spooling.	2	CO3	K1	PO9
1i.	Give an outline about TLB.	2	CO4	K4	PO2
1j.	What is a Scheduler? Also give its types.	2	CO2	K1	PO1

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

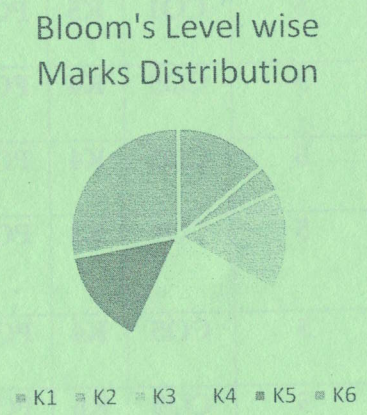
Q NO	Questions	Marks	COs	KL	PO
2a.	Compare the working of FCFS, and RR scheduling.	2	CO2	K2	PO4
2b.	Throw some light on Readers Writers Problem in Process Synchronization.	3	CO1	K4	PO4
3a.	Differentiate between Deadlock and Starvation. How can we resolve starvation?	3	CO4	K1	PO3
3b.	Discuss about any two multithreaded models.	2	CO1	K2	PO3
4a.	For the given set of processes, evaluate the average Turn Around Time and Average Waiting Time using SJF scheduling (Pre-emptive). P_id AT BT P1 1 4 P2 2 5 P3 3 2 P4 4 1 P5 5 6 P6 6 3	3	CO2	K5	PO4
4b.	In relation to operating system, define thread. Also explain its life cycle.	2	CO2	K2	PO1
5a.	Perform a comparative analysis of pre-emptive and non-pre-emptive Scheduling. Also give examples of relevant algorithms for each.	3	CO1	K1	PO4
5b.	Provide 2 differences between monolithic and micro kernels.	2	CO2	K5	PO4
6a.	For the given set of processes, evaluate the average Turn Around Time and Average Waiting Time using FCFS scheduling. P_id AT BT P1 3 1 P2 1 4 P3 4 2 P4 0 6 P5 2 3	3	CO4	K5	PO2
6b.	Evaluate the maximum number of pages needed If a system supports 16 bit address line and 1K page size.	2	CO2	K1	PO
7.	Define Operating System and Explain any 3 types of OS with advantages and disadvantages.	5	CO3	K4	PO

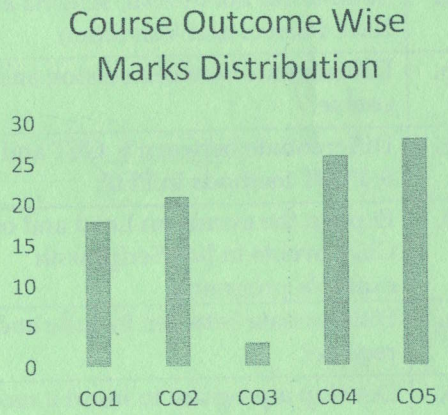
Section C (Answer any THREE out of FIVE) – 30 Marks-(Each question Carry 10 Marks)

Q NO	Questions	Marks	COs	KL	PO
8a.	With reference to classical IPC problems, discuss with neat diagram Dining-philosophers problem. Also mention the feasible solution for the same.	6	CO3	K3	PO3
8b.	What is booting? Explain the process of booting in detail.	4	CO1	K2	PO1
9a.	What is demand paging? Outline about virtual memory and its advantages.	4	CO4	K4	PO2
9b.	Using LRU page replacement scheme, calculate the page fault, miss ratio, and hit ratio for the given reference string: 4,7,6,1,7,6,1,2,7,2. Page frames=4	6	CO4	K6	PO4
10a.	What is Convoy effect? Show an example to justify your answer.	4	CO2	K2	PO3
10b.	What is paging? Using FIFO page replacement scheme, calculate the page fault, miss ratio, and hit ratio for the given reference string: 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1 Page frames=3	6	CO4	K5	PO4

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

Course Outcomes	CO1	Understanding the basics of internet and its connections, web browsers
	CO2	Understanding client-server architecture and use in internet
	CO3	Able to configure basic LAN and connect computers to it.
	CO4	Able to combine HTML, CSS, JavaScript for form validation
	CO5	Understanding the implementation of PHP with database





	ARKAJAIN University Jharkhand		**END TERM EXAMINATION**
Branch	**Computer Science & Engineering**	Program	**POLY**
Course Name	**Web Technologies**	Semester	**IV**
Course Code	**DIP14212**	Year	**2022/Even**
Time: 3 Hour Maximum 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 Q1a to Q1j) – 20 Marks

Q. No.1	QUESTIONS	Marks	COs	KL	PO
1a.	List the different basic protocols used in Internet.	2	CO1	K1	PO2
1b.	What do you mean by Relative URLs?	2	CO2	K1	PO2
1c.	Write the functions of a Web Server.	2	CO2	K2	PO1
1d.	State the function of DNS and the protocol used.	2	CO2	K3	PO2
1e.	Write HTML code to display an image.	2	CO4	K3	PO3
1f.	Mention the need for cascading style sheets.	2	CO4	K3	PO4

Q. No.	QUESTION	Marks	COs	KL	PO
1g.	Assess the data types in XML schema.	2	CO1	K4	PO4
1h.	Quote the uses of cookies.	2	CO1	K1	PO2
1i.	Explain ordered list & unordered list in HTML	2	CO4	K4	PO1
1j.	What do you mean by Server Side Scripting?	2	CO5	K5	PO3

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

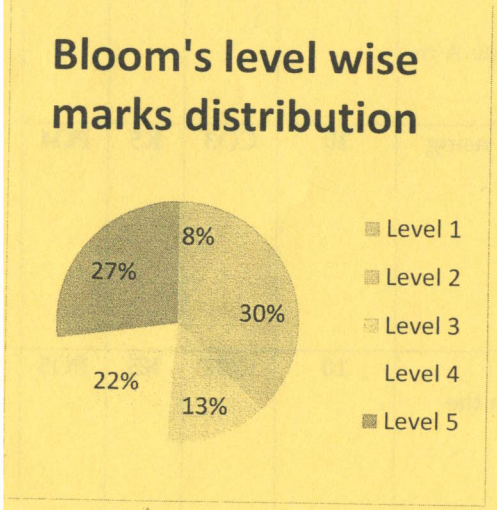
Q. No.	QUESTIONS	Marks	COs	KL	PO
2a.	Differentiate HTML and XHTML.	3	CO4	K4	PO1
2b.	Recall in detail about Internet and World Wide Web.	2	CO1	K1	PO1
3a.	Give the structure of HTTP request and response messages.	3	CO2	K3	PO2
3b.	State and explain any four HTML elements in detail.	2	CO4	K5	PO1
4a.	Discuss JavaScript Array object in detail	3	CO4	K6	PO4
4b.	Explain external style sheet with an example.	2	CO2	K2	PO4
5a.	Write JavaScript to find sum of first 'n' even numbers and display the result. Get the value of 'n' from user.	3	CO3	K6	PO4
5b.	Summarize on the following (i) DOM based Parsing. (ii) SAX based Parsing.	2	CO4	K2	PO2
6a.	What is the use of strlen () and strpos () functions?	3	CO5	K1	PO4
6b.	Discuss about Numeric array, Associative array and Multidimensional array.	2	CO5	K1	PO4
7a.	What is the use of strlen() and strpos() functions?	3	CO5	K1	PO4
7b.	Discuss about Numeric array, Associative array and Multidimensional array.	2	CO5	K1	PO4

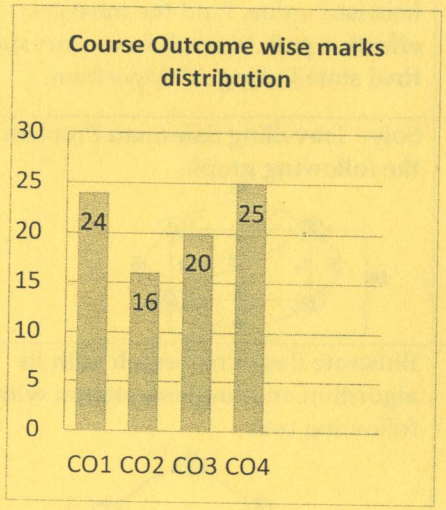
Section C (Answer any THREE out of FIVE) – 30 Marks-(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8a.	Briefly discuss the HTML frame and table tags.	5	CO1	K6	PO1
8b.	Develop an interactive web page for student registration using HTML form elements.	5	CO4	K6	PO3
9a.	Explain how local and global functions can be written using JavaScript.	5	CO2	K5	PO2
9b.	Write short notes on JavaScript built-in objects.	5	CO2	K6	PO1
10a.	Summarize about XML schema and XML Parsers and Validation.	5	CO1	K5	PO4
10b.	Differentiate between session and cookie.	5	CO5	K4	PO2
11a.	Differentiate between $_GET and $_POST methods in PHP.	5	CO5	K4	PO3
11b.	Explain the events on Load and on Click events in JavaScript with example programs.	5	CO4	K3	PO3
12a.	Differentiate between include and require?	5	CO5	K4	PO3
12b.	Develop a program to insert a record into an employee table in MySQL from PHP.	5	CO5	K6	PO4

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

Course Outcomes	CO1	Understanding the basics of Data Analysis skills through artificial intelligence
	CO2	Understanding and Creating AI/ML solutions for various fundamental problems
	CO3	To inculcate nontrivial understanding of the real-world problems.
	CO4	Able to understand and apply various Data decomposition and analysis schemes.





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	ARKAJAIN University Jharkhand		**END TERM EXAMINATION**
Branch	**Computer Science & Engineering**	Program	**POLY**
Course Name	**Artificial Intelligence and Machine Learning**	Semester	**IV**
Course Code	**DIP15215**	Year	**2022/Even**
Time: 3 Hour Maximum 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 Q1a to Q1j) – 20 Marks

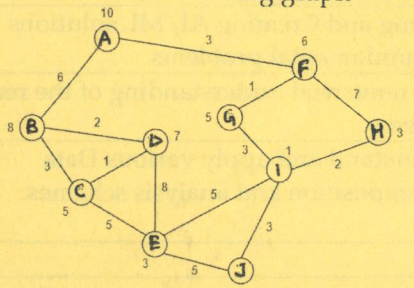
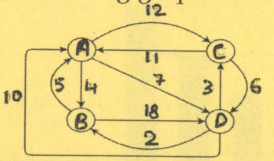
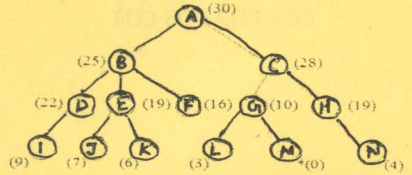
Q. No.1	Questions	Marks	COs	KL	PO
1a.	What is Intelligence?	2	CO1	K1	PO1
1b.	What do you understand by Artificial Intelligence?	2	CO1	K2	PO1
1c.	What is Meta-Knowledge?	2	CO2	K1	PO5
1d.	Define Heuristic search.	2	CO2	K1	PO2
1e.	Differentiate informed and uninformed search.	2	CO2	K5	PO5
1f.	Differentiate Propositional and Predicate Logic.	2	CO2	K5	PO4
1g.	What is learning? What are its types	2	CO2	K4	PO1
1h.	Write the history of Artificial Intelligence.	2	CO2	K1	PO1
1i.	Justify the use of searching in game	2	CO2	K3	PO3

1j.	What is Neural Network?	2	CO2	K1	PO2

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

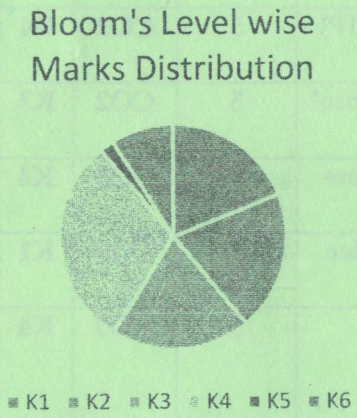
Q NO	Questions	Marks	COs	KL	PO
2a.	Define intelligent agent.	2	CO2	K3	PO1
2b.	What is heuristic function? Differentiate between blind search and heuristic search strategies.	3	CO2	K4	PO2
3a.	Differentiate supervised and unsupervised learning.	3	CO4	K4	PO1
3b.	Give Expert systems three application area.	2	CO1	K3	PO3
4a.	Point out the importance of search in AI.	2	CO1	K2	PO1
4b.	Mention the four important factors to consider for the use of specific search algorithm.	3	CO1	K2	PO3
5a.	Give the block diagram of the application of the AI with brief explanation.	3	CO1	K3	PO4
5b.	Classify in machine learning	2	CO4	K2	PO1
6a.	Explain BFS with a suitable example.	2	CO4	K4	PO2
6b.	Explain DFS with a suitable example.	3	CO4	K4	PO2
7a.	Define over-fitting.	2	CO4	K4	PO2
7b.	Define under-fitting.	3	CO4	K4	PO2

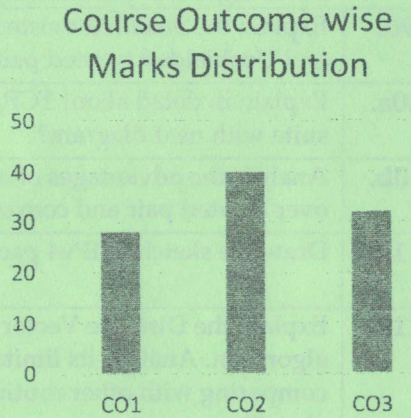
Section C (Answer any THREE out of FIVE) – 30 Marks-(Each question Carry 10 Marks)

Q NO	Questions	Marks	COs	KL	PO
8.	Consider the following graph-  The numbers written on edges represent the distance between the nodes. The numbers written on nodes represent the heuristic value. Find the most cost-effective path to reach from start state A to final state J using A* Algorithm.	10	CO4	K5	PO5
9.	Solve Travelling Salesman Problem using the following graph- 	10	CO3	K5	PO4
10.	Illustrate Best First Search with its algorithm and implementation with the following tree. 	10	CO3	K5	PO5
11.	How problem characteristics helps in the selection of AI technique. Explain these characteristics with possible examples	10	CO3	K2	PO1
12.	Explain stages in the development of an expert system.	10	CO1	K2	PO1

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

Course Outcomes	CO1	Understanding of computer networks, issues, limitations, options available
	CO2	Understanding of the care that needs to be taken while developing applications designed to work over computer networks
	CO3	Able to configure basic LAN and connect computers to it.





	ARKAJAIN University Jharkhand		**END TERM EXAMINATION**
Branch	**Diploma in Computer Science & Engineering**	Program	**DIPLOMA**
Course Name	**Computer Networks**	Semester	**IV**
Course Code	**DIP14051**	Year	**2022/Even**
Time: 3 Hour Maximum 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 Q1a to Q1j) – 20 Marks

Q. No.1	QUESTIONS	Marks	COs	KL	PO
1a.	How do guided media differ from unguided media?	**2**	**CO3**	**K6**	**PO1**
1b.	In what way would you analyse circuit switched and packet switched networks?	**2**	**CO2**	**K5**	**PO4**
1c.	List out the advantages of star topology.	**2**	**CO1**	**K2**	**PO2**
1d.	Which layer implements the node to node channel connection in OSI layered architecture?	**2**	**CO1**	**K4**	**PO1**
1e.	Outline the services provided by the Data link layer.	**2**	**CO2**	**K2**	**PO2**
1f.	How would you design Class A, Class B	**2**	**CO3**	**K1**	**PO2**

1g.	Differentiate between TCP and UDP.	2	CO1	K2	PO1
1h.	Discover the services provided by Transport layer protocol?	2	CO2	K4	PO2
1i.	Choose the class of the following IP address: (a) 110.34.56.45 (b) 212.208.63.23	2	CO2	K6	PO2
1j.	Identify when can an application make use of UDP?	2	CO2	K3	PO3

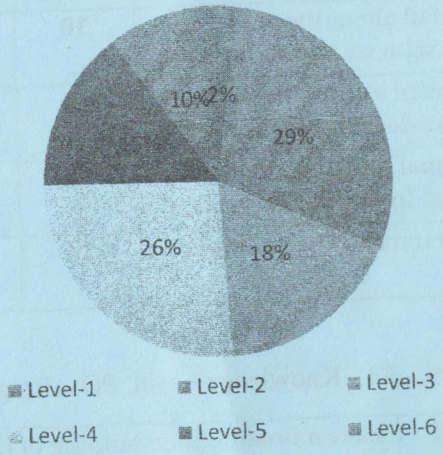
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question 5 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
2a.	Generalize LAN, WAN and MAN.	3	CO3	K3	PO1
2b.	Assume 6 devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?	2	CO3	K3	PO1
3a.	Why are protocols needed?	3	CO1	K3	PO1
3b.	What are the two approaches to packet switching?	2	CO2	K2	PO2
4a.	Examine your understanding on File Transfer Protocol	3	CO2	K4	PO2
4b.	Explain the WWW in detail.	2	CO1	K1	PO1
5a.	Identify the comparison between SMTP, MIME and IMAP	3	CO2	K3	PO2
5b.	Summarize the elements of network management and explain the operation of SNMP protocol in detail.	2	CO2	K2	PO2
6a.	Analyse in detail about DNS operation.	3	CO3	K4	PO4
6b.	How would you express URL?	2	CO3	K3	PO4
7a.	Examine the function of SSH components?	3	CO3	K4	PO4
7b.	Classify the advantages of connection oriented services over connectionless services.	2	CO1	K4	PO1

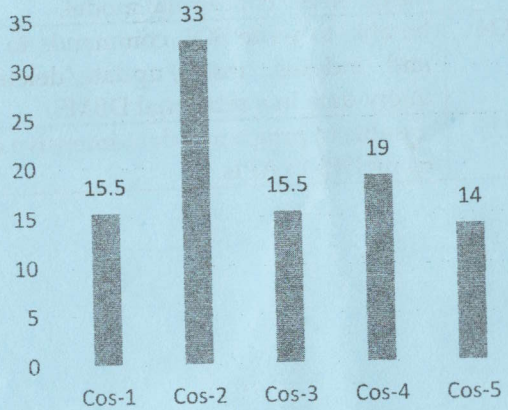
Section C (Answer any THREE out of FIVE) – 30 Marks-(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL	PO
8a.	Draw the OSI network architecture and explain the functionalities of every layer in detail.	5	CO1	K1	PO2
8b.	Explain the types of transmission modes.	5	CO1	K2	PO1
9a.	Briefly explain the different types of packet switching techniques with suitable networks. Write each of its advantages and disadvantages.	5	CO2	K1	PO4
9b.	Explain the Shielded twisted pair (STP) and Unshielded twisted pair (UTP).	5	CO2	K4	PO4
10a.	Explain in detail about TCP/IP protocol suite with neat diagram?	5	CO2	K3	PO2
10b.	Analyse the advantages of optical fibre over twisted pair and coaxial cable	5	CO3	K4	PO4
11a.	Draw the sketch of IPv4 packet header.	5	CO2	K1	PO2
11b.	Explain the Distance Vector routing algorithm. Analyse its limitations comparing with other routing algorithms.	5	CO3	K4	PO3
12a.	Infer the functions performed by of DNS. Give example.	5	CO1	K2	PO1
12b.	Formulate the working of Email in detail.	5	CO3	K6	PO1

Bloom's Level wise marks Distribution



Course Outcome wise Marks Distribution



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	ARKAJAIN University Jharkhand		END TERM EXAMINATION
Branch	Computer Science & Engineering	Program	POLY
Course Name	Introduction to Data Base Management System	Semester	IV
Course Code	DIP14199	Year	2022/Even
Time: 3 Hour Maximum 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 Q1a to Q1j) – 20 Marks

Q. No.1	Questions	Marks	COs	KL	PO
1a.	What is data independence?	2	1	2	10
1b.	Define the term Entity.	2	1	1	10
1c.	Difference between relational calculus and relational algebra	2	2	2	2
1d.	What is transitive Dependency?	2	5	2	1&4
1e.	Why database security is important?	2	5	4	1&4
1f.	What is schema?	2	2	2	2
1g.	Explain commands with respect to SQL i) Rename ii) Alter	2	4	4	4
1h.	What is an instance?	2	2	2	2

1i.	List out Data base applications	2	1	4	10
1j.	Write short notes on nested queries.	2	4	2	4

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

Q NO	Questions	Marks	COs	KL	PO
2a.	Describe the properties of a relation	2.5	3	3	3&5
2b.	What is functional dependency?	2.5	1	2	10
3a.	What is redundance?	2	1	2	10
3b.	Explain the anomalies in relational database	3	3	2	3&5
4.	State BCNF in details	5	2	4	2
5.	List different types of database users.	5	1	4	10
6.	Mention various DML operations with examples	5	4	5	4
7.	How does DBMS provide data abstraction? Explain the concept of data independence.	5	2	3	2

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

Q NO.	Questions	Marks	COs	KL	PO
8.	Consider the following schemas: Sailors (sid, sname, rating, age) Reserves (sid, bid, day) Boats (bid, bname, color) Write the following queries in relational algebra, tuple relational Calculus and domain relational calculus: a) Find the name of sailors who have reserved boat 103. b) Find the names and ages of sailors with a rating above 7. c) Find the names of sailors who have reserved a red boat. d) Find the sname, bid, and day for each reservation. e) Find the name of sailors who have reserved at least one boat.	10	4	6	4
9.	Discuss in detail about the concepts of E-R model with suitable examples.	10	3	5	3&5
10.	Describe in detail about two-tier and three-tier client-server architectures.	10	2	2	2
11.	What is a normal form? Explain about various normal forms with examples	10	2	4	2
12.	Discuss about transaction recovery techniques.	10	5	3	1&4

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

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