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ARKA JAIN University, Jharkhand — NAAC GRADE A, ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science & Engineering	Program	B. TECH
Subject Name	Discrete Mathematics	Semester	IV
		Year	June- 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

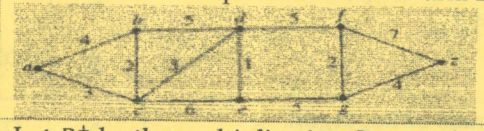
Section A (Each question Carry 02 Marks from Q1-i to Q1-x) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	Find the duality of $(P \vee q) \wedge (p \vee r)$.	2	CO1	K1
ii	Define Identity permutation.	2	CO1	K3
iii	A binary operation on the set of real numbers $a * b = a+b+ab$ finds inverse element	2	CO3	K2
iv	Prove That $A' \cup B' = (A \cap B)'$	2	CO2	K3
v	Find the number of the diagonals of heptagon.	2	CO3	K5
vi	Find all partition of X= {1,2,3}.	2	CO4	K4
vii	How many ways are there to arrange the nine letters in the word ALLAHABAD.	2	CO1	K3
viii	Write the inverse and contrapositive of the conditional statement if 2+3=5 then Ram is an honest man.	2	CO3	K2
ix	what do you mean by adjacency matrix.	2	CO2	K3
x	Prove That $p \rightarrow q = \sim p \vee q$	2	CO3	K5

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Let m be the positive integers with m>1. Show that the relation R={(a, b):a≡ $b(mod\ m)$}.is an equivalence relation on set of integers.	5	CO1	K3
3	By using principle of mathematical induction prove that (3^{2n+2}-8n-9) is divisible by 8 for all natural numbers	5	CO3	K2
4	How many numbers from 1 to 1000 are not divisible by 2,3 and 5.	5	CO1	K3
5	Obtain the principle Conjunctive Normal form of (P∨ q) ∧~ $p \rightarrow \sim q$.	5	CO3	K5
6	Find the orders of elements 0,1,2,3,4,5,6,7,8,9 of the group $\{z_{10}, +_{10}\}$.	5	CO4	K4
7	Draw the graph with the following adjacency matrix $\begin{bmatrix}1&1&1&0&1\\1&1&0&1&0\\1&0&0&0&0\\0&1&1&1&1\\1&1&0&1&0\end{bmatrix}$	5	CO2	K3

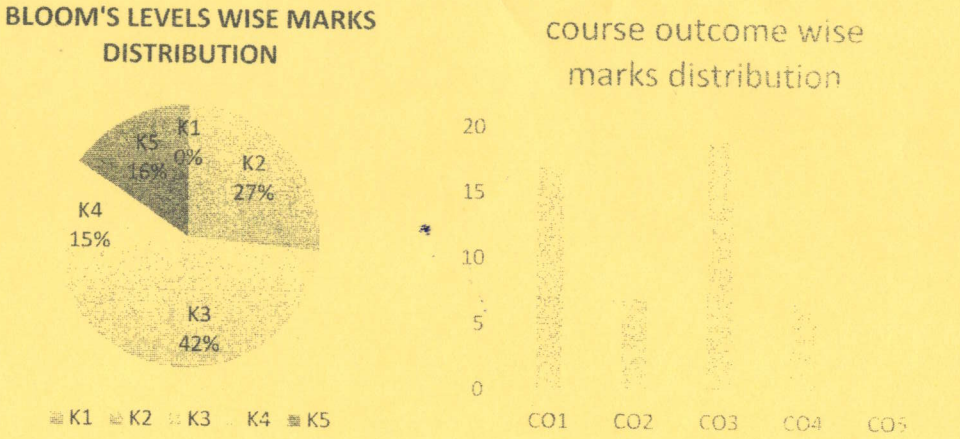
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Find the shortest path between 'a' and z 	10	CO1	K3
9	Let R^+ be the multiplicative Group of positive real numbers and let R be the addictive group of real numbers consider the mapping f: $R^+ \rightarrow R$ given by f (x) =logx. show that f is an isomorphism.	10	CO3	K5
10	Prove that the argument $\frac{(p \rightarrow q)}{(q \rightarrow r)}$ / $(p \rightarrow r)$ is valid argument.	10	CO4	K4
11	In a town of 10,000 families, it was found that 40% families buy newspaper A,20% families buy newspaper B and 10% families by newspaper C. further 5% families buy both A and B, 3% buy BandC, 4% buy A and C. If 2% buy all the three newspapers, find the number of families which buy (i) A only (ii) none of A,B and C.	10	CO2	K3
12	Let f:X→ Y be a mapping and let A, B ⊆Y. then (i) f^{-1}(A∩ B)= f^{-1}(A)∩ $f^{-1}(B)$ (ii) f^{-1}(AUB) = f^{-1}(A)U $f^{-1}(B)$	10	CO3	K2

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

Course Outcomes	CO1	An ability to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to get the solution of the engineering problems.
	CO2	Ability to Identify, formulates, review research literature, and analyze complex engineering problems.
	CO3	Ability to design solutions for complex Engineering Problems by considering social, Economic and Environmental aspects
	CO4	Use research-based knowledge to design, conduct analyze experiments to get valid conclusion.
	CO5	Ability to create, select, and apply appropriate techniques, and to model complex engineering activities with an understanding of the limitations.

GRAFICAL REPRESENTATION



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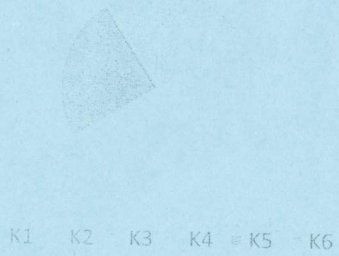
...rse Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

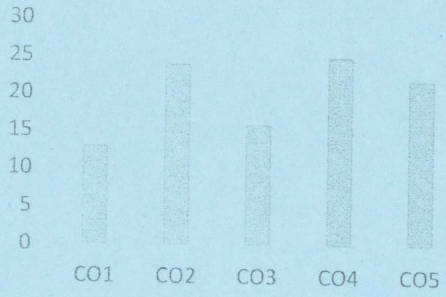
Course Outcomes	CO1	To Identify mechanisms to create processes and threads.
	CO2	Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time
	CO3	For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time
	CO4	Design and implement file management system
	CO5	Develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

GRAFICAL REPRESENTATION

Bloom's Level Wise Marks Distribution



Course Outcome Wise Marks Distribution



ARKA JAIN University Jharkhand — NAAC GRADE A — ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Engineering & IT

Branch	**Computer Science and Engineering**	**Program**	**B. Tech**
Subject Name	**Operating System**	**Semester**	**IV**
		Year	**June 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 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 a Scheduler? Also give its types.	2	CO1	K1
ii	Give an outline about TLB.	2	CO1	K3
iii	List four major activities of an OS	2	CO2	K2
iv	What is a semaphore?	2	CO2	K4
v	How does Real time OS differ from Batch OS?	2	CO2	K4
vi	Differentiate between SJF and RR Scheduling.	2	CO2	K1
vii	What is context switch and what perception does it generate?	2	CO3	K1
viii	Compare internal and external fragmentation	2	CO4	K2
ix	Explain the terms deadlock and livelock.	2	CO5	K4
x	Define the terms critical section and mutual exclusion.	2	CO1	K5

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Compare the working of pre-emptive, and non-pre-emptive scheduling.	5	CO2	K4
3	For the given set of processes, calculate the average Turn Around Time and Average Waiting Time using Priority scheduling. Consider lower the value, higher the priority.	5	CO2	K5
4	Mention the jobs performed by a kernel. Also provide 2 differences between monolithic and micro kernels.	5	CO3	K3
5	Differentiate between Deadlock and Starvation. How can we resolve starvation?	5	CO4	K2
6	Discuss about any two multithreaded models.	5	CO4	K2
7	Throw some light on Readers Writers Problem in Process Synchronization.	5	CO5	K4

P_id	AT	BT	Priority
P1	1	4	1
P2	2	5	2
P3	3	2	3
P4	4	1	4
P5	5	6	5
P6	6	3	6

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

Q. No.	QUESTIONS	Marks	COs	KL
8	What is disk scheduling? Compare FCFS and SCAN disk scheduling algorithms	10	CO4	K5
9	What is paging? Using FIFO 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=3	10	CO3	K3
10	What is a safe state/safe sequence? Write down and explain the working of Bankers algorithm.	10	CO5	K4
11	What is a thread? Explain in detail the life cycle of a thread.	10	CO2	K5
12	Describe any two in details: i. Context Switch ii. Shared memory model iii. Message Passing model	10	CO5	K6

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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	B. Tech
Subject Name	Computer Organization & Architecture	Semester	IV
		Year	June 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 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

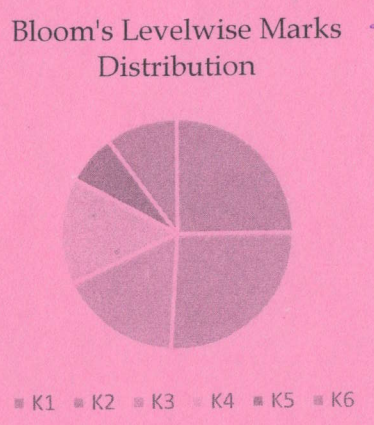
Q. N 1	QUESTIONS	Marks	COs	KL
i	What is auxiliary memory?	2	CO5	K1
ii	Define Arithmetic Logic Unit and control unit.	2	CO1	K1
iii	Define IR and PC.	2	CO1	K1
iv	What is cache coherence problem?	2	CO5	K3
v	What are pipelining hazards?	2	CO4	K1
vi	What is cache?	2	CO5	K2
vii	Describe addressing Modes.	2	CO2	K2
viii	Define single bus structure.	2	CO3	K2
ix	What is cache memory mapping? List the types of mapping policies used.	2	CO5	K1
x	Perform the arithmetic operations (-32) – (-11) in binary using signed 2's complement representation for negative numbers.	2	CO2	K5

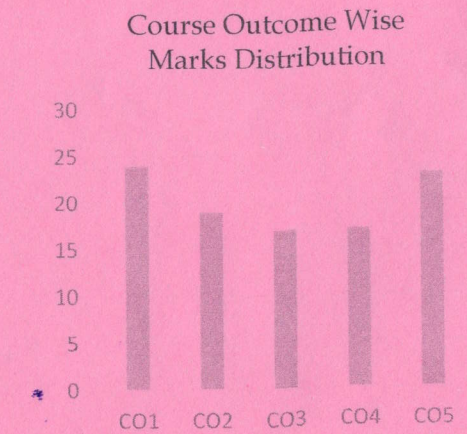
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Discuss bus structure and why it is used?	05	CO3	K3
3	Compare and contrast RISC and CISC architecture	05	CO1	K4
4	Explain the functional units of a computer.	05	CO2	K2
5	A non-pipelined system takes 50 ns to process a task. The same task can be processed in 6 segment pipeline with a clock cycle of 10 ns. Determine approximately the speed up ratio of the pipeline for 500 tasks.	05	CO4	K5
6	Discuss the various types of cache miss.	05	CO5	K2
7	Write down various addressing modes used in microprocessors. Explain any three of them with examples.	05	CO1	K1
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	Elaborate in detail the memory hierarchy with neat diagram. Give reasons why cache is used.	10	CO5	K4
9	Draw and explain functional block diagram of 8086 microprocessor	10	CO3	K1
10	Explain Flynn's taxonomy in detail.	10	CO4	K2
11	Perform below multiplication using booth's multiplication algorithm for signed numbers: (-9) x 10	10	CO2	K6
12	Describe pipelining with example and diagram. Write its advantages and disadvantages. Discuss various pipeline hazards as well.	10	CO4	K3

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

Course Outcomes	CO1	Familiarize and understand basic structure and organization of computer architecture
	CO2	Understand and implement arithmetic operations
	CO3	understand the concept of I/O organization and underlying architecture of bus
	CO4	To understand and implement pipelining and parallelism for higher performance
	CO5	Familiarize with cache memory and memory management by the concept of paging

GRAPHICAL REPRESENTATION





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ARKA JAIN University, Jharkhand — NAAC GRADE A			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science & Engineering	Program	B. Tech
Subject Name	Design & Analysis of Algorithms	Semester	IV
		Year	June 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 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	State Master's Theorem.	2	CO1	K1
ii	List two main types of randomized algorithms.	2	CO5	K1
iii	What is branch and bound method?	2	CO2	K2
iv	What is the Cook's Theorem?	2	CO4	K2
v	Define substitution method.	2	CO1	K1
vi	List the advantages of dynamic programming.	2	CO2	K1
vii	Write down the properties of asymptotic notations.	2	CO1	K2
viii	Define the single source shortest path problem.	2	CO3	K1
ix	What is bin packing problem?	2	CO2	K2
x	Define heuristics algorithm.	2	CO2	K2

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Find the optimal solution for the following fractional Knapsack problem. n=4, m = 60, W={40, 10, 20, 24} and P={280, 100, 120, 120}	05	CO3	K3
3	Explain the process of designing an algorithm. Give characteristics of an algorithm.	05	CO1	K3
4	Describe one type of randomized algorithm.	05	CO5	K3
5	Write short notes on minimum spanning tree.	05	CO3	K2
6	Explain NP-hard and NP-complete problems.	05	CO4	K2
7	Explain the Travelling salesmen problem using Dynamic Programming.	05	CO2	K3

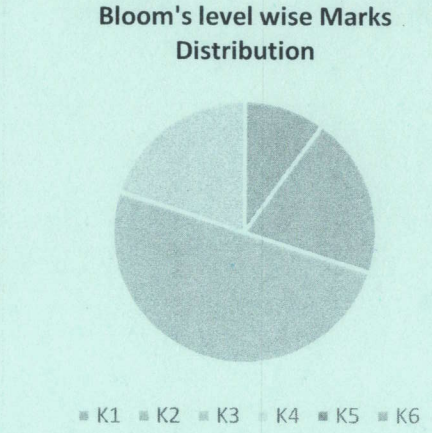
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

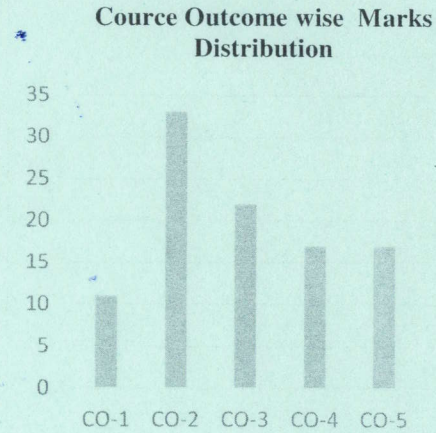
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain network flow algorithm with an example.	10	CO3	K3
9	Describe an approximation algorithm.	10	CO5	K3
10	Explain Matrix chain multiplication in dynamic programming.	10	CO2	K3
11	Solve a travelling sales person problem using dynamic programming	10	CO2	K4
12	Solve the following Recurrence equation by substitution method. T(n) =1, if n=1 =n*T(n-1) if n>1	10	CO4	K4

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

Course Outcomes	CO1	Formulate simple algorithms for arithmetic and logical problems.
	CO2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms.
	CO3	Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.
	CO4	For a given model engineering problem model it using graph and write the corresponding algorithm to solve the problems
	CO5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach.

GRAFICAL 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**	**B. Tech.**
Subject Name	**Computer Networks**	**Semester**	**IV**
		Year	**June 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 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 half duplex and duplex mode of transmission.	2	CO 1	KL2
ii	Write a short note on any one network topology.	2	CO 1	KL4
iii	Define transmission media and give a few examples.	2	CO 2	KL1
iv	Classify the following tasks performed by the various layers (Physical, Data Link Network, Transport, session, Presentation, Application, etc.) of OSI model 1. Segmentation and reassembling. 2. Delivery of message is error free 3. Bit synchronization 4. Mail services.	2	CO 1	KL1
v	What is packet switching?	2	CO 2	KL1
vi	Mention any two charecteristics of CSMA/CD.	2	CO 4	KL1
vii	Differentiate between single bit error and burst error?	2	CO 5	KL4
viii	Differentiate between wireless networks and wired network based on their characteristics.	2	CO 5	KL4

ix	Find the class of below addresses: a) 178.5.78.90 b) 10.134.35.67 c) 192.230.23.45 d) 191.23.45.56	2	CO 4	KL1
x	What is the difference between IMAP and POP?	2	CO4	KL4

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Write in detail about satellite communication.	05	CO1	KL1
3	Differentiate between circuit switching and packet switching.	05	CO2	KL1
4	Discuss the CSMA/CD algorithm of Ethernet. How it has affected the communication?	05	CO4	KL1
5	Suppose the following block of 16 bits is to be sent using a CHECKSUM of 8 bits: 10101001 00111001. Find the pattern of bits sent by the sender.	05	CO1	KL1
6	Discuss the following: 1. UDP 2. TCP, based on their operations.	05	CO2	KL1
7	Explain with diagram bus topology and write its advantages and disadvantages.	05	CO4	KL1

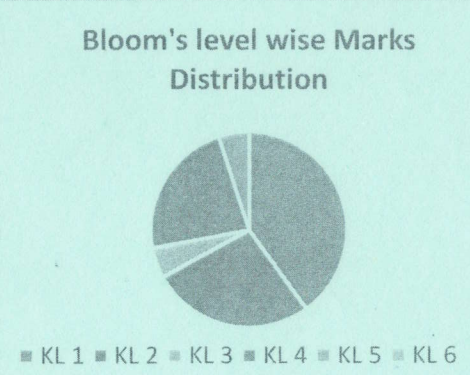
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

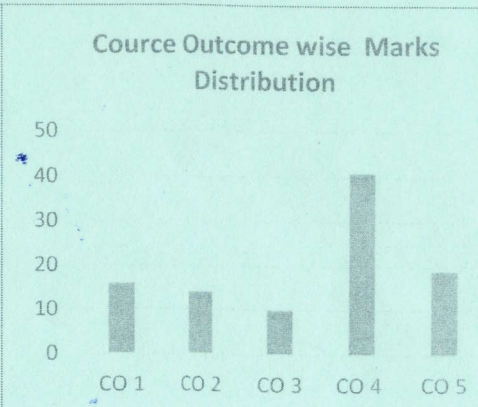
Q. No.	QUESTIONS	Marks	COs	KL
8	What are the layers of the ISO/OSI model? Briefly list out their functions.	10	CO1	KL1
9	Write in detail about socket programming.	10	CO2	KL1
10	For the following dataword 1010011110 and the divisor 10111 (Using Cyclic redundancy check (CRC) method) i. Show the generation of the codeword (encoded data) at the sender site. ii. Show the checking of the codeword at the receiver site (assume no error).	10	CO4	KL1
11	Explain in detail about the error and flow control mechanisms employed at data link layer.	10	CO5	KL4
12	Explain in details IP addressing methods.	10	CO5	KL4

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

Course Outcomes	CO1	Familiarize the student with the components of the Internet and the concepts of layered protocol architecture.
	CO2	Expose the student to the important principles behind the working of various layers of a network.
	CO3	Enable the student to write simple network applications using socket programming.
	CO4	Demonstrate the working of the most important protocols used in the internet.
	CO5	Acquaint the student with the basic of wireless networking.

GRAFICAL REPRESENTATION





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ARKA JAIN University, Jharkhand — NAAC GRADE A			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science and Engineering	Program	B. Tech
Subject Name	Software Engineering	Semester	IV
		Year	June 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 x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	What is the prime objective of software engineering?	2	CO1	K1
ii	Define software engineering paradigm.	2	CO1	K1
iii	Give the importance of software engineering.	2	CO1	K2
iv	Distinguish between process and methods.	2	CO2	K3
v	Write any two characteristics of software as a product.	2	CO2	K3
vi	What are the non-functional requirements of software?	2	CO4	K2
vii	What is data dictionary? How is it used in software engineering?	2	CO5	K1
viii	What is the software architecture?	2	CO5	K2
ix	Why testing is important with respect to software?	2	CO4	K1
x	Mention the advantages of CASE tools.	2	CO3	K4

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

No.	QUESTIONS	Marks	COs	KL
2	Identify the umbrella activities in software engineering process.	5	CO2	K2
3	Explain the feasibility studies. What are the outcomes? Does it have either implicit orexplicit effects on software requirement collection?	5	CO1	K4
4	Describe how software requirements are documented? State the importance ofdocumentation.	5	CO2	K4
5	Write short notes on user interface design process?	5	CO5	K3
6	Justify "Design is not coding and coding is not design".	5	CO4	K5
7	Why the software needs maintenance? Explain in detail about the maintenance process.	5	CO5	K2

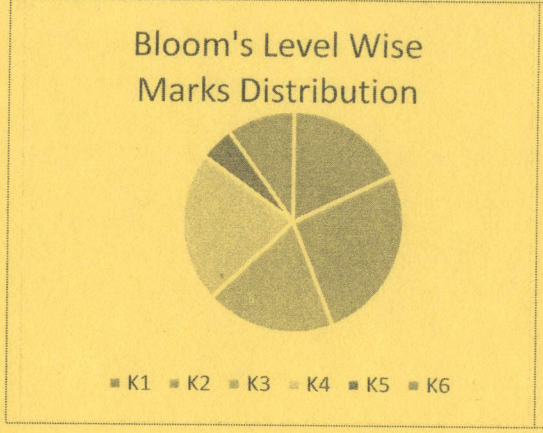
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

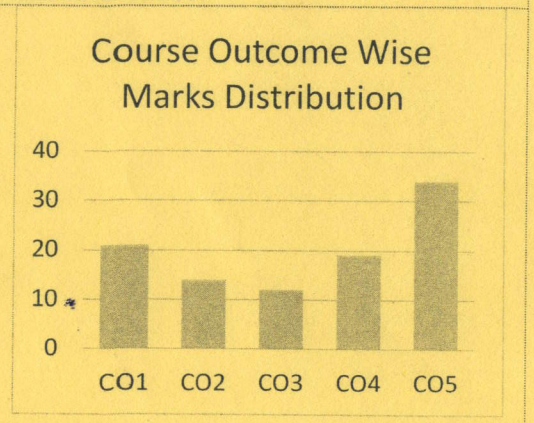
No.	QUESTIONS	Marks	COs	KL
	Explain waterfall model for software life cycle and discuss variousactivities in each phase	10	CO1	K3
	What are the characteristics of a good design? How design evaluation is performed?	10	CO5	K4
9	What do you mean by integration testing? Explain their outcomes.	10	CO4	K4
	Write short notes on a) COCOMO estimation criteria. b) Software metrics	10	CO3	K2
2	Write briefly on a) CASE b) Software complexity measure.	10	CO5	K6

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

Course Outcomes	CO1	Interpret, plan, and develop the frame work of a software engineering project.
	CO2	Monitor & manage the risk during the design of software project.
	CO3	Calculate the cost of software, using cost estimation models such as COCOMO II.
	CO4	Identify and apply testing strategies & methods on software projects.
	CO5	Implement clean room techniques to develop as well as maintain software throughout its lifetime.

GRAPHICAL REPRESENTATION





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ARKA JAIN University, Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Branch	**Computer Science and Engineering**	**Program**	**B. Tech**
Subject Name	**Internet of Things**	**Semester**	**IV**
		Year	**June 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 x) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	Name the Need for sensors in IoT.	2	CO1	K1
ii	Define Arduino and write the feature of Arduino.	2	CO1	K1
iii	Name any four services offered by Raspberry Pi.	2	CO3	K2
iv	Write the significant of IoT systems.	2	CO1	K3
v	List out the steps used in internet gateway device.	2	CO3	K3
vi	What do you mean by sketch in Raspberry Pi?	2	CO4	K2
vii	What constitutes the IOT platform?	2	CO2	K1
viii	List out various IoT Protocol.	2	CO1	K2
ix	Analyze IoT Security Threats and Attacks.	2	CO4	K4
x	Differentiate BLE and RFID.	2	CO2	K4

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Differentiate Raspberry with Arduino.	5	CO2	K2
3	Discuss in detail about Arduino pins with neat sketch.	5	CO1	K4
4	Demonstrate the issues with IoT standardization.	5	CO3	K4
5	Discuss in detail privacy in IOT.	5	CO2	K3
6	Discuss in detail about how the IOT is applied in various applications.	5	CO4	K5
7	What are the IoT Security Requirements? Discuss in detail.	5	CO2	K2

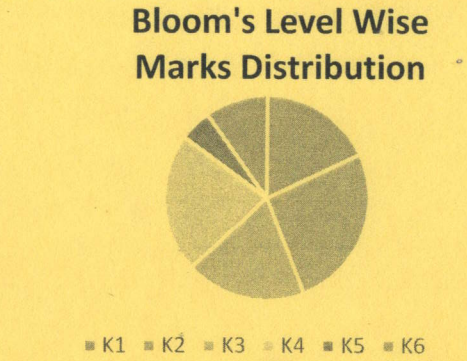
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

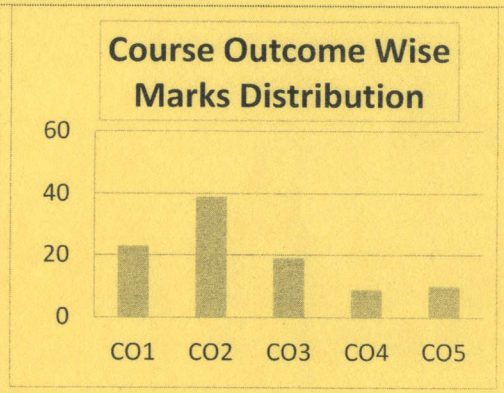
Q. No.	QUESTIONS	Marks	COs	KL
8	Describe the i) Zigbee Security Ii) RFID Security	10	CO2	K3
9	Write in detail about the IoT Architecture.	10	CO1	K4
10	Write short notes on: i) CoAP ii) XMPP iii) NFC	10	CO3	K4
11	WAP using Raspberry Pi for DHT sensor	10	CO2	K2
12	Generalize the IoT communication APIs i) REST –based communication APIs ii) WebSocket-based Communication APIs	10	CO5	K6

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

Course Outcomes	CO1	Introduce the fundamental concepts of IoT and physical computing
	CO2	Expose the student to a variety of embedded boards and IoT Platforms
	CO3	Create a basic understanding of the communication protocols in IoT communications.
	CO4	Familiarize the student with application program interfaces for IoT.
	CO5	Enable students to create simple IoT applications.

GRAPHICAL REPRESENTATION





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ARKA JAIN University, Jharkhand (NAAC GRADE A, ACCREDITED UNIVERSITY)			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science and Engineering	Program	B. Tech
Subject Name	Microprocessor and Microcontroller	Semester	IV
		Year	June 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 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 accumulator?	2	CO1	K2
ii	What is the technology used in 8086 Microprocessor?	2	CO3	K1
iii	Mention some features of 8085.	2	CO1	K1
iv	Give any two applications of RRC.	2	CO1	K3
v	What is machine cycle?	2	CO4	K1
vi	Write down the control word format of 8253.	2	CO2	K2
vii	What is DMA Controller?	2	CO2	K3
viii	What are the different timers available in 8051 Microcontroller?	2	CO3	K4
ix	What is the significance of 8051 microcontroller in embedded system?	2	CO1	K5
x	What is the purpose of special function registers (SFRs) in the 8051 Microcontroller?	2	CO2	K4

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

Q. No.	QUESTIONS	Marks	COs	KL
2	Explain any five instruction sets of 8085.	05	CO1	K2
3	Explain the flag register configuration of 8085.	05	CO1	K1
4	Describe the status register of 8086.	05	CO3	K5
5	Write an assembly language program to add two 8 bits numbers.	05	CO5	K3
6	Describe about the counters available in 8051 Microcontroller.	05	CO4	K5
7	Draw the pin diagram of 8255 and label all its ports.	05	CO3	K4

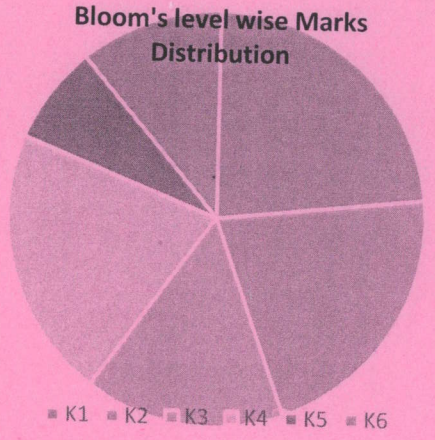
Section C (Answer any THREE out of FIVE) – 30 Marks-
(Each question Carry 10 Marks)

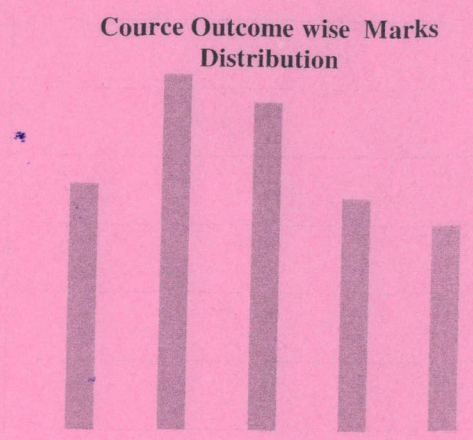
Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the different addressing modes of 8085.	10	CO5	K1
9	Explain the concept of machine cycles and instruction cycles in the 8085 Microprocessor. How are they related to T-states?	10	CO2	K3
10	Explain the role of the four 8-bit ports (P0, P1, P2, P3) in the 8051 Microcontroller.	10	CO2	K4
11	Mention and explain the modes in which 8086 can operate.	10	CO4	K2
12	Mention the differences between 8085 and 8086.	10	CO3	K6

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

Course Outcomes	CO1	Assess and solve basic binary math operations using microprocessor and explain the Microprocessor's and microcontroller's internal architecture and its operation within the area of manufacturing and performance.
	CO2	Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.
	CO3	Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements.
	CO4	Analyse assembly language program; select appropriate assemble into machine across assembler utility of a microprocessor and microcontroller.
	CO5	Design electrical circuitry to the Microprocessor I/O ports to interface the processor to external devices.

GRAFICAL REPRESENTATION





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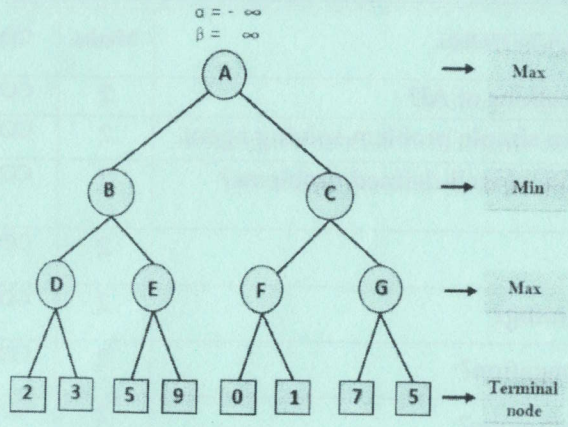
ARKA JAIN University, Jharkhand (NAAC Grade A, Accredited University)			END SEM EXAMINATION School of Engineering & IT
Branch	Computer Science & Engineering	Program	B. Tech
Subject Name	Introduction to Artificial Intelligence and its Applications	Semester	IV
		Year	June 2024
Time: 3 Hour Max. Marks : 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 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 are various applications of AI?	2	CO1	K1
ii.	List the steps involved in simple problem-solving agent.	2	CO1	K2
iii.	What are the components of well-defined problems?	2	CO2	K1
iv.	Describe Turing test?	2	CO3	K2
v.	Explain plan space planning?	2	CO5	K2
vi.	What is constraint propagation?	2	CO4	K1
vii.	Explain Beam search technique?	2	CO5	K2
viii.	Explain Mutation and cross over.	2	CO6	K2
ix.	What is pheromones with respect to ant colony optimisation?	2	CO3	K1
x.	Define the heuristic search. Discuss benefits and short comings?	2	CO4	K4

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

(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Illustrate Rule Based Systems?	05	CO1	K3
3	Represent the following statements in predicate logic: i) Marcus tried to assassinate Caesar. ii) All Pompeian's were Roman. iii) All Romans were either loyal to Caesar or hated him. iv) Everyone is loyal to someone. v) People only try to assassinate rulers they are not loyal to.	05	CO5	K6
4	Illustrate the use of predicate logic to represent the knowledge with suitable example .	05	CO6	K4
5	What is forward chaining? Explain with the help of a diagram.	05	CO4	K1
6	Solve the following using Alpha Beta Pruning. 	05	CO6	K5
7	Compose the steps of hill climbing search techniques.	05	CO6	K6

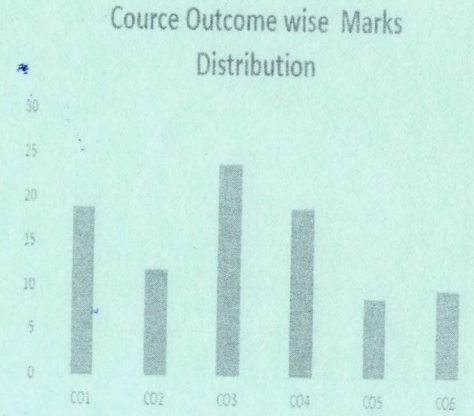
Section C (Answer any THREE out of FIVE) – 30 Marks- (Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	What is "Artificial Intelligence and Artificial Intelligence Technique"? Briefly explain how AI Technique can be represented and list out some of the task domain of AI.	10	CO1	K1
9	Discuss the following search Technique with the help of an example. Also discuss the benefits and shortcoming of each. I. Breadth First Search. II. Depth First Search.	10	CO3	K6
10	List down the characteristics of intelligent agent.	10	CO2	K2
11	Describe how a constraint satisfaction problem (CSP) may be solved.	10	CO3	K2
12	What is an agent? What are the different types of agents? Define rational agent.	10	CO1	K2

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

Course Outcomes	CO1	Illustrate artificial intelligence, the role of intelligent agents, uninformed and informed search techniques
	CO2	Examine competitive environments like game problems
	CO3	Interpret many real-world problems as constraint satisfaction problems
	CO4	Illustrate what knowledge representation is and distinguish propositional and first-orderlogics.
	CO5	Infer proofs using resolution in first-order logic
	CO6	Illustrate various real world applications of expert systems.

GRAFICAL REPRESENTATION



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ARKA JAIN University, Jharkhand — NAAC GRADE A, ACCREDITED UNIVERSITY				END SEM EXAMINATION School of Engineering & IT	
Branch	Computer Science and Engineering			Program	B. Tech
Subject Name	Sensor Technology And Instrumentation			Semester	IV
				Year	June 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-xx) – 20 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	Give different classifications of sensors.	2	CO1	K1
ii	State different static characteristics of sensors.	2	CO1	K3
iii	What is a photo diode?	2	CO3	K2
iv	What is Virtual Instrumentation?	2	CO2	K1
v	What is front panel in LabVIEW?	2	CO5	K5
vi	Compare active and passive sensors.	2	CO3	K2
vii	Mention two examples of mechanical sensors.	2	CO3	K1
viii	List the applications of LDR.	2	CO4	K1
ix	Mention the different data types used in LabVIEW.	2	CO5	K2
x	Distinguish MEMS and Microsystems.	2	CO3	K4

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

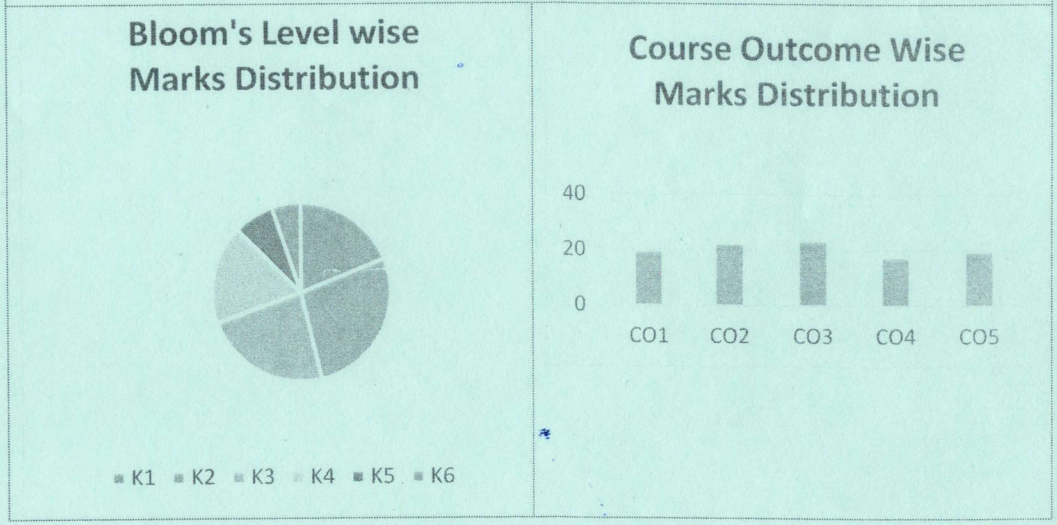
Q. No.	QUESTIONS	Marks	COs	KL
2	In relation to piezo-electric transducers discuss and describe voltage sensitivity and charge sensitivity.	5	CO2	K2
3	Compare transducers and sensors.	5	CO1	K4
4	The resistance at 27^0 C is given as 100 ohm in a RTD. Find the resistance at 100^0C. $\alpha = 0.0034/^0$C.	5	CO4	K6
5	What constitutes a smart sensor and how it differs from traditional sensors.	5	CO3	K4
6	Write short notes on nanosensors.	5	CO2	K2
7	Compare and contrast Virtual instrumentation and traditional instrument.	5	CO5	K5

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

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the below in brief: a. Phototransistor b. Photomultiplier	10	CO1	K1
9	Describe the working principle of thin film sensors, including the mechanisms of piezo resistivity.	10	CO3	K3
10	Discuss about the different data types used in LabVIEW?	10	CO4	K3
11	Discuss below term with respect to LVDT: a. Construction of LVDT b. Residual error in LVDT c. Applications of LVDT	10	CO2	K2
12	Illustrate a block diagram of Virtual instrumentation. Mention the steps to create Sub Virtual instrumentation.	10	CO5	K4

Course Outcomes	CO1	Explain the principles, performance characteristics and Application of Sensors.
	CO2	Describe the principles and types of Resistive, Capacitive, and Inductive sensors.
	CO3	Summarize Principles and applications of Magnetic and Optical sensors.
	CO4	Explain advancements in Sensors Technology and their application areas.
	CO5	Apply Virtual instrumentation in IoT technologies

GRAPHICAL REPRESENTATION



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