

KLS Vishwanathrao Deshpande Institute of Technology

(Accredited by NAAC with "A" Grade)

(Approved by AICTE, New Delhi, Affiliated to VTU, Belagavi)

(Recognized Under Section 2(f) by UGC, New Delhi)

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

University / Model Question Paper Scheme & Solution

Faculty Name	:	SURAS KADLE
Course Name	:	Introduction to AI and Applications
Course Code	:	1BAIA203
Year of Question Paper	:	Model Question Paper - I
Date of Submission	:	24/01/2026

Faculty Member
(SURAS KADLE)

Head of the Department
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Model question Paper-I

CBCS SCHEME**First/ Second Semester B.E Degree Examination, 2025-26****Introduction to AI and Applications (1BAIA103/203)****TIME: 03 Hours****Max.Marks:100**

Notes:

1. Answer any FIVE full questions, choosing at least ONE question from each MODULE
2. M: Marks, L: Bloom's level, C: Course outcomes.

Module -1			M	L	C
Q.01	a	What is Artificial Intelligence. Explain how does AI work? List out three advantages and disadvantages of Artificial Intelligence.	8	L2	CO1
	b	Compare weak AI and strong AI.	6	L2	CO1
	c	What is Machine Learning. Relate AI and Machine Learning?	6	L2	CO1
OR					
Q.02	a	Explain five components of Intelligence with example. Compare Inductive reasoning with deductive reasoning.	8	L2	CO1
	b	What is AI Agent? Classify the agents in an AI system.	6	L2	CO1
	c	Is Depth First Search (DFS) an informed search or uninformed search? Justify your answer	6	L2	CO1
Module-2					
Q. 03	a	Apply ethical prompt construction to minimize bias in AI-generated content.	8	L3	CO4
	b	Develop a use-case scenario where prompt engineering improves communication clarity in cross-cultural conversations.	6	L3	CO4
	c	Design a Few-Shot Prompt that trains ChatGPT to classify customer feedback as positive, neutral, or negative.	6	L3	CO4
OR					
Q.04	a	Apply creative prompts to generate innovative ideas for a sustainable startup project.	8	L3	CO4
	b	Develop imaginative prompts to enhance product design creativity in engineering students.	6	L3	CO4
	c	Apply LLM-based writing prompts to produce creative content for digital marketing campaigns.	6	L3	CO4
Module-3					
Q. 05	a	Write Basic neural network model explaining the function of each layer.	8	L2	CO2
	b	"ML Model is a combination of Task, Performance and Experience", Explain with suitable an example.	6	L2	CO2
	c	Is Labelled data supervised or unsupervised machine learning? Extend your answer explaining different types of machine learning.	6	L2	CO2
OR					
Q. 06	a	Outline K-Means Algorithm with merits and demerits.	8	L2	CO2
	b	A company decides to carry out its business operations on a rented space. If the cost of the rental space is Rs 20000 plus Rs 500 per employee per day, then compute monthly rental for space given that the company is open 5 days a week. Show a linear equation for this scenario with explanation.	6	L2	CO2
	c	Explain the four steps to create Decision Trees with suitable example for each step.	6	L2	CO2
Module-4					

Q. 07	a	List and explain any four Trusted AI principles.	8	L2	CO5
	b	What is expert system? Explain three components of expert system.	6	L2	CO5
	c	Relate the role of ethics in AI.	6	L2	CO5
OR					
Q. 08	a	Explain the working of an expert system taking any example.	8	L2	CO5
	b	AI could be programmed to do something beneficial, but the method used to achieve its goal can be highly destructive, Explain why?	6	L2	CO5
	c	What is Artificial Intelligence of Things (AIoT). Explain how Does AIoT Work?	6	L2	CO5
Module-5					
Q. 09	a	List different types of Robots. Identify and explain industry application of Robots.	8	L3	CO3
	b	What is No-Code AI. Explain why No-Code AI Must be Used?	6	L2	CO3
	c	Explain the role of AI in early disease prevention.	6	L2	CO3
OR					
Q. 10	a	What is the role of AI in Medical Diagnosis? Identify three applications of AI in Medical Diagnosis.	8	L3	CO3
	b	Relate the role of AI in Biology and Environmental Sciences.	6	L2	CO3
	c	What is Low Code AI. Compare Traditional tools with Low Code AI.	6	L2	CO3



Q.No.	Solution and Scheme	Marks								
1a)	<p>What is Artificial Intelligence. Explain how does AI work? List out three advantages and disadvantages of Artificial Intelligences.</p> <p>→ Artificial Intelligence (AI) is the science and engineering of making intelligent machines especially intelligent computer programs.</p> <p>AI works by processing large datasets, recognizing patterns, and making decisions using algorithms. It involves learning, reasoning, and self-correction:</p> <ul style="list-style-type: none"> * Learning - AI learns from data * Reasoning - AI chooses the correct algorithm. * Self-correction - AI refines algorithms for accuracy. <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Advantages</u></td> <td style="text-align: center;"><u>Disadvantages</u></td> </tr> <tr> <td>1) Automates complex processes.</td> <td>1) Involves more cost.</td> </tr> <tr> <td>2) Generates consistent and accurate results.</td> <td>2) Technical expertise required to develop and use AI applications</td> </tr> <tr> <td>3) Takes less time to perform tasks that needs to process huge volumes of data.</td> <td>3) Lack of trained professionals.</td> </tr> </table>	<u>Advantages</u>	<u>Disadvantages</u>	1) Automates complex processes.	1) Involves more cost.	2) Generates consistent and accurate results.	2) Technical expertise required to develop and use AI applications	3) Takes less time to perform tasks that needs to process huge volumes of data.	3) Lack of trained professionals.	<p>8M</p> <p>2M</p> <p>2M</p> <p>2M</p> <p>2M</p>
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1b)	<p>Compare weak AI and strong AI.</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Weak AI</u></td> <td style="text-align: center;"><u>Strong AI</u></td> </tr> <tr> <td>1) It supports a narrow range of applications with a limited scope.</td> <td>1) It supports a wider range of application with a wider scope.</td> </tr> <tr> <td>2) This application is good at specific task.</td> <td>2) This application has an incredible human-level intelligence.</td> </tr> </table>	<u>Weak AI</u>	<u>Strong AI</u>	1) It supports a narrow range of applications with a limited scope.	1) It supports a wider range of application with a wider scope.	2) This application is good at specific task.	2) This application has an incredible human-level intelligence.	<p>6M</p> <p>1.5M each</p>		
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Head of the Department
Electronics & Communication Engg.

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Q.No.	Solution and Scheme	Marks
	<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p><u>Weak AI</u></p> <p>3) It uses supervised and unsupervised learning to process data.</p> <p>4) Example :- Siri, Alexa</p> </div> <div style="width: 45%;"> <p><u>Strong AI</u></p> <p>3) It uses clustering and association techniques to process data.</p> <p>4) Example :- Advanced Robotics.</p> </div> </div>	
	<p>1C) What is Machine Learning. Relate AI and Machine Learning?</p> <p>Machine Learning (ML) is a branch of AI that teaches machines to learn from data and make decisions without being explicitly programmed.</p>	6M
		2M
	<p>* Machine Learning is a subset of AI, used specifically for learning from data to make decisions.</p> <p>* ML helps achieve AI by making machines learn and adapt.</p>	2M
	<p><u>"OR"</u></p>	
	<p>2a) Explain five components of Intelligence with example. Compare Inductive reasoning with deductive reasoning.</p>	8M
	<p>Five components of Intelligence are :-</p> <ol style="list-style-type: none"> 1) Reasoning, 2) Learning, 3) Problem Solving, 4) Perception, 5) Linguistic intelligence. <p>1) <u>Reasoning</u> :- is the process used to make decisions and predictions. It involves analyzing information and drawing conclusions based on evidence.</p>	1M

Q.No.	Solution and Scheme	Marks		
	<p>2) <u>Learning</u> :- is the process of gaining knowledge or skills by studying, practicing, or experiencing something. It helps humans, animals, and even AI systems to improve their understanding of different subjects.</p> <p>3) <u>Problem Solving</u> :- is the process of finding a solution to a challenge or issue.</p> <p>4) <u>Perception</u> :- is the process of, * acquiring information, * interpreting that information to understand, * selecting important details and organizing them.</p> <p>5) <u>Linguistic Intelligence</u> :- It is used in interpersonal communication and defines one's ability to use, comprehend, speak and write the verbal and written language.</p>	4M		
	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;"><u>Inductive Reasoning</u></p> <p>1) It uses specific observations to make broad general statements.</p> <p>2) Even if all observations are true, there are still chances that the conclusion can be false.</p> <p>Example :- 'Manvi is topper, Manvi is studious. Therefore, all toppers are studious.'</p> </td> <td style="width: 50%; vertical-align: top;"> <p style="text-align: center;"><u>Deductive Reasoning</u></p> <p>1) It starts with a general statement to obtain a specific, logical conclusion.</p> <p>2) If something is true for a particular class of things in general, it is also true for all members of that class.</p> <p>Example :- 'Students who scored at least 80% are eligible for placement. Manoj scored 90%. Therefore, Manoj is an eligible candidate.'</p> </td> </tr> </table>	<p style="text-align: center;"><u>Inductive Reasoning</u></p> <p>1) It uses specific observations to make broad general statements.</p> <p>2) Even if all observations are true, there are still chances that the conclusion can be false.</p> <p>Example :- 'Manvi is topper, Manvi is studious. Therefore, all toppers are studious.'</p>	<p style="text-align: center;"><u>Deductive Reasoning</u></p> <p>1) It starts with a general statement to obtain a specific, logical conclusion.</p> <p>2) If something is true for a particular class of things in general, it is also true for all members of that class.</p> <p>Example :- 'Students who scored at least 80% are eligible for placement. Manoj scored 90%. Therefore, Manoj is an eligible candidate.'</p>	3M
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2b)	<p>What is AI Agent? Classify the agents in an AI System.</p> <p>→ AI agents act in their environment, AI agent can be anything that is capable of perceiving its environment, these may include other agents.</p> <ul style="list-style-type: none"> * they perceive their environment using sensors. * they act upon the environment using effectors. 	6M 2M		



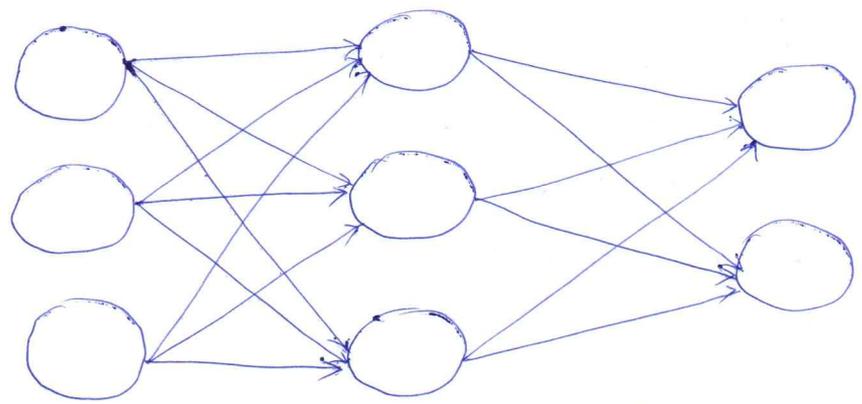
Q.No.	Solution and Scheme	Marks
	<p><u>Types of Agents in an AI System :-</u></p> <p>1) Human Agent :- Sensors : Eyes, Ears, Nose, skin etc. Effectors : Hands, Legs, mouth for taking action.</p> <p>2) Robotic Agent :- Sensors : Cameras, infrared range finders, Effectors : Motors, actuators to perform actions.</p> <p>3) Software Agent :- Sensors : Uses bit strings as its programs. Effectors : Executes programmed actions based on those bit strings.</p>	4M
2C7	<p>Is Depth First Search (DFS) an informed search or uninformed search? Justify your answer</p>	6M
→	<p>Depth first search (DFS) is an uninformed search algorithm.</p>	1M
	<p><u>Justification :-</u></p> <p>Uninformed search is one that explores the search space without using any additional problem-specific knowledge about where the goal might be.</p>	
	<p>* DFS does not use heuristics or estimates of how close a node is to the goal.</p>	5M
	<p>* DFS explores as deep as possible along one branch before backtracking.</p>	
	<p>* The choice of which node to expand next is solely on the search strategy (stack/recursion), not on goal proximity or cost information.</p>	
	<p style="text-align: center;"><u>Module - 2</u></p>	
3a)	<p>Apply ethical prompt construction to minimize bias in AI-generated content.</p>	8M
→	<p>Ethical prompt construction refers to designing AI prompts that are clear, neutral, and</p>	2M

(A)

Q.No.	Solution and Scheme	Marks
	<p>inclusive to ensure fair and unbiased outputs.</p> <p>To minimize bias in AI-generated content:</p> <ul style="list-style-type: none"> * Use neutral and non-leading language. * Avoid stereotypes or assumptions. * Clearly state the need for fairness and multiple perspectives. * Define context and constraints explicitly. 	1.5M each
3b)	<p>Develop a use-case scenario where prompt engineering improves communication clarity in cross-cultural conversations.</p> <p>→ <u>Scenario</u>: - A multinational company has team members from India, Japan, Germany, and the USA working together on a global software project. Due to cultural differences in communication styles - such as indirect language, formality levels, and varying interpretations of feedback - misunderstandings frequently occur during emails and virtual meetings.</p> <p>Prompt engineering is used to improve communication clarity by carefully framing prompts given to the AI system. For example, instead of a generic prompt like "Write a project update mail", an ethically designed prompt is used:</p> <p>"Write a polite, culturally neutral project update email suitable for a diverse international team. Use clear language, avoid idioms, and maintain a respectful and inclusive tone."</p>	6M 2M 2M 2M
3c)	<p>Design a few-shot prompt that trains the ChatGPT to classify customer feedback as positive, neutral, or negative.</p>	6M

Q.No.	Solution and Scheme	Marks
<p>→</p>	<p>Few-shot prompt :- generates a response based on a few examples you provide.</p> <p><u>Instruction to ChatGPT :-</u></p> <p>You are an AI assistant that classifies customer feedback into one of the following categories: Positive, Neutral, or Negative. Read the feedback carefully and respond with only the sentiment level.</p> <p>Example 1:</p> <p>Customer feedback: "The product quality is excellent and delivery was very fast." Sentiment: Positive.</p> <p>Example 2:</p> <p>Customer feedback: "The product is okay, but the delivery time was average." Sentiment: Neutral</p> <p>Example 3:</p> <p>Customer feedback: "I am very disappointed with the service. The item arrived damaged." Sentiment: Negative.</p> <p style="text-align: center;"><u>"OR"</u></p>	<p>1M</p> <p>2M</p> <p>3M</p>
<p>4a) →</p>	<p>Apply creative prompts to generate innovative ideas for a sustainable startup project.</p> <p>→ Creative prompts can be used to stimulate innovative thinking and help AI systems generate unique and practical ideas for sustainable startup project.</p> <p>Examples :-</p> <p>1) "Generate five innovative startup ideas that solve environmental problems using renewable energy, waste reduction, or eco-friendly materials"</p>	<p>8M</p> <p>2M</p>

Q.No.	Solution and Scheme	Marks
	<p>2) "Design a startup concept based on the circular economy model where waste from one industry becomes a resource for another".</p> <p>3) "Create a sustainable startup idea that empowers local communities while promoting environmental conservation".</p> <p>4) "Propose a technology-based startup that uses AI, IoT, or data analytics to improve sustainability in agriculture, energy, or urban living".</p> <p>5) "Develop an innovative business idea that directly contributes to climate change mitigation and carbon footprint reduction".</p>	6M
A5)	Develop imaginative prompts to enhance product design creativity in engineering students.	6M
→	Imaginative prompts act as cognitive triggers that stimulate creative thinking, problem reframing, and innovation.	1M
1)	"Imagine an engineering product that behaves like a living organism. Identify the biological traits it borrows and explain how they influence the design".	
2)	"Design a low cost engineering product suitable for rural environments with limited infrastructure".	1M
3)	"Create a product that can be repaired by the user without professional tools."	each
4)	"Describe a day in the life of a user before and after the introduction of a product".	
5)	"Design the least user-friendly version of a product and then refine it into the most user-friendly version."	

Q.No.	Solution and Scheme	Marks
<p>4C) Apply LLM-based writing prompts to produce creative content for digital marketing campaigns.</p> <p>→ Prompts provide clarity and structure, enabling LLMs to generate outputs aligned with communication goals.</p> <p>1) "Write a promotional Instagram caption for eco-friendly products targeting young urban professionals."</p> <p>2) "Create a persuasive email campaign highlighting limited-time offers using a friendly tone."</p> <p>3) "Generate a storytelling-based brand message that emotionally connects with customers."</p> <p>4) "Create a product tagline using only five words and an optimistic tone."</p>		<p>6M</p> <p>2M</p> <p>1M each</p>
<p><u>"Module-3"</u></p>		
<p>5a) Write Basic neural network model explaining the function of each layer.</p>		<p>8M</p>
<p>→ Basic neural network model</p>		
<p><u>Input layer</u> <u>Hidden layer</u> <u>Output layer.</u></p>		
		
<p>A neural network is a type of AI that works like the human brain. It helps machine learn patterns from data and make decisions or predictions. These are group of connected "neurons" that pass information to each other to</p>		

Q.No.	Solution and Scheme	Marks
	<p>understand complex data. Each neuron (node) is a like a decision-maker which takes input, processes it, and passes output to the next node.</p> <p>A neural network has three main layers:</p> <p>1) <u>Input layer</u>:</p> <ul style="list-style-type: none"> * Receives raw input data from the external environment. * Each neuron in its layer represent one input feature. <p>2) <u>Hidden layer(s)</u>:</p> <ul style="list-style-type: none"> * A neural network may have one or more hidden layers. * it performs computations on input data using weights, bias, and activation functions. * Extracts patterns, relationships, and features from the input data. * Responsible for learning and intelligence of the model. <p>3) <u>Output layer</u>:-</p> <ul style="list-style-type: none"> * Using suitable activation functions depending on the problem type, it produces the final prediction or classification result. 	<p>2M</p> <p>2M</p>
5b)	<p>"ML Model is a combination of Task, Performance and Experience", Explain with suitable example.</p> <p>→ "A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at task in T, as measured by P, improves with experience E."</p> <p>ML model has three key components:</p> <ul style="list-style-type: none"> * Task (T), * Experience (E), and * Performance (P) 	<p>6M</p> <p>3M</p>
	<p><u>Example</u>: Let's say we want to build a model to predict house prices (Task T):</p> <ul style="list-style-type: none"> * Task defines the problem. - Predict the price of a house based on 	<p>1M</p>

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Q.No.	Solution and Scheme	Marks
	<p>features like size, location, and number of rooms.</p> <p>* Experience (E), provides data for the model to learn from.</p> <p>- We provide the model with historical data on house sales (eg., size, location, price).</p> <p>* Performance (P), measures the model's effectiveness using metrics.</p> <p>- The model's performance is measured by how accurately it predicts the price of new houses, which we evaluate using metrics like mean squared error or R^2.</p>	2M
5C)	<p>Is labelled data supervised or unsupervised machine learning? Extend your answer explaining different types of machine learning.</p>	6M
→	<p>Labelled data is used in supervised machine learning.</p>	1M
	<p>* <u>In supervised learning</u>, the dataset contains input data along with corresponding correct output labels labels. The learning algorithm is trained using these labelled examples so that it can learn the mapping between inputs and outputs. Once trained, the model can predict outputs for new, unseen data.</p>	2M
	<p>* <u>Unsupervised learning</u> is a type of machine learning where the model is trained using unlabelled data. The algorithm identifies hidden patterns or structures in the data without any guidance.</p>	1M
	<p>* <u>Semi-supervised learning</u> uses a combination of labelled and unlabelled data. A small amount of labelled data guides learning, while a large amount of unlabelled data improves accuracy.</p>	1M

Q.No.	Solution and Scheme	Marks
	<p>* <u>Reinforcement Learning</u> is a type of ML where an agent learns by interacting with an environment and receiving feedback in the form of rewards or penalties.</p>	1M
	<p><u>"OR"</u></p>	
6a)	<p>Outline K-Means Algorithm with merits and demerits.</p>	8M
→	<p>K-Means is a popular unsupervised learning algorithm used for clustering. It groups data into K clusters where each cluster contains data points that are more similar to each other than to those in other clusters.</p>	2M
	<p><u>Outline of K-Means algorithm:-</u></p>	
	<p>1) Choose the number of clusters (K).</p>	
	<p>2) Initialize centroids - Randomly select K data points from the dataset as initial cluster centroids.</p>	
	<p>3) Assign data points to clusters - Each data point is assigned to the nearest centroid using a distance measure.</p>	
	<p>4) Recalculate centroids. - For each cluster, compute the new centroid by taking the mean of all data points assigned to that cluster.</p>	1M
	<p>5) Repeat steps 3 and 4 - until centroids no longer change, or a maximum number of iterations is reached.</p>	
	<p>6) Final clusters obtained. - Algorithm converges, resulting in K well-defined clusters.</p>	
	<p><u>Merits:-</u></p>	
	<p>* Simple and fast</p>	
	<p>* Scalable</p>	1M
	<p>* Works well for spherical clusters.</p>	

Q.No.	Solution and Scheme	Marks
	<p><u>Demerits:</u></p> <ul style="list-style-type: none"> * Needs Predefined 'k'. * Sensitive to Outliers * Random Initialization * Non-Optimal for Non-Spherical clusters. 	1M
6b)	<p>A company decides to carry out its business operations on a rented space. If the cost of the rental space is Rs. 20000 plus Rs 500 per employee per day, then compute monthly rental for space given that the company is open 5 days a week. Show a linear equation for this scenario with explanation.</p>	6M
→	<p><u>Given:-</u></p>	
	<p>Fixed rental cost = Rs. 20,000/-</p>	
	<p>Variable cost per employee per day = Rs. 500/-</p>	2M
	<p>Company operates 5 days per week.</p>	
	<p>Weeks per month = 4 Weeks.</p>	
	<p>Let the number of employees = x</p>	
	<p>The linear equation in this scenario, can be given as,</p>	
	$y = (500)(5)(4)x + 20000$	
	$\therefore y = 10000x + 20000$	2M
	<p>If 20 employees are to be present every day, then monthly rental would be</p>	
	$y = 10000 \times 20 + 20000$	
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> $\therefore y = 2,20,000/-$ </div>	
	<p>* 20000/- is fixed monthly rental cost.</p>	
	<p>* 10000x represents the variable monthly cost which increases linearly with the number of employees.</p>	2M



Q.No.	Solution and Scheme	Marks
6C)	<p>Explain the four steps to create Decision Trees with suitable example for each step.</p> <p>→ <u>Steps to Build a Decision Tree</u>:</p> <p>1) <u>Select a Feature to split</u> First decision is to select the feature that best separates the data into different classes. <u>Example</u>:- Let outlook of the day be one of the dataset for deciding to play cricket.</p> <p>2) <u>Split the Data</u> Split the data based on the chosen feature, creating two or more sub-nodes. Each sub-node represents a further division of data. <u>Example</u>:- Outlook dataset can be split into: * Outlook = Sunny, * Outlook = Rainy, * Outlook = Overcast.</p> <p>3) <u>Repeat</u> Continue splitting the data at each node using the most relevant feature until the data cannot be divided further or a stopping criterion is met. <u>Example</u>:- For subset Outlook = sunny, the next attribute may be Humidity. * If Humidity = High → Do not play * If Humidity = Normal → play.</p> <p>4) <u>Assign class to Each Leaf</u> Once the tree reaches a leaf node, assign the class based on the majority class of the data at that leaf. <u>Example</u>:- If all instances under outlook = Overcast result in Play, then this branch directly leads to a leaf node labeled Play.</p>	<p>6M</p> <p>1.5M each</p>

Q.No.	Solution and Scheme	Marks
7a)	<p style="text-align: center;"><u>"Module -4"</u></p> <p>List and explain any four Trusted AI principles.</p> <p>→ 1) <u>Responsible</u> :- AI should be safeguarding human rights and protecting the data we are entrusted with.</p> <p>2) <u>Accountable</u> :- AI should seek and leverage feedback for continuous improvement.</p> <p>3) <u>Transparent</u> :- AI should develop a transparent user experience to guide users through machine-driven recommendations.</p> <p>4) <u>Empowering</u> :- AI should promote economic growth and employment for our customers, their employees, and society as a whole.</p> <p>5) <u>Inclusive</u> :- Respecting the societal values of all those impacted, not just those of the creators.</p>	8M 2M 3M 3M
7b)	<p>What is expert system? Explain three components of expert system.</p> <p>→ Expert system is a computer program designed to solve complex problems with human-like expertise. Expert systems are used to assist, not replace, human decision-making in specific domains. Examples :- Medicine, Science.</p> <p><u>Components of Expert System</u> :-</p> <p>1) <u>User Interface</u> :-</p> <ul style="list-style-type: none"> * Allows user to interact with the system. * Accepts user queries in natural language and provides understandable results. <p>2) <u>Inference Engine</u> :-</p> <ul style="list-style-type: none"> * It is the "brain" of the expert system. * Processes information from the knowledge base to draw conclusions. 	6M 2M 1.5M each

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Q.No.	Solution and Scheme	Marks
	<p>* Two types, * Deterministic & * Probabilistic.</p> <p>3) <u>Knowledge Base</u> :-</p> <p>* Stores domain-specific knowledge.</p> <p>* Two types, * Factual Knowledge, & * Heuristic Knowledge.</p>	
7C)	<p>Relate the role of ethics in AI.</p>	6M
→	<p>Ethics plays a crucial role in AI because AI systems increasingly influence human lives, decisions, and social structures. Ethics ensures that AI is developed and used responsibly, fairly, and for the benefit of humanity rather than causing harm.</p>	2M
	<p>1) <u>Ensuring Fairness and Reducing Bias</u> :-</p> <p>AI systems learn from data, which may contain social or cultural biases. Ethics in AI helps ensure fair decision-making, preventing discrimination based on gender, race, age, or religion.</p>	
	<p>2) <u>Protecting Privacy and Data Security</u> :-</p> <p>AI often relies on large amounts of personal data. Ethical principles guide how data is collected, stored, and used, ensuring user privacy, consent, and protection against misuse or data breaches.</p>	2M
	<p>3) <u>Accountability and Transparency</u> :-</p> <p>Ethical AI demands that AI decisions are explainable and traceable. Humans must remain accountable for AI actions, especially in critical systems like healthcare, autonomous vehicles, and financial services.</p>	
	<p>4) <u>Social Impact and Employment</u> :-</p> <p>AI affects jobs and the workforce. Ethical AI promotes responsible automation, reskilling, and minimizing negative impacts on employment and society.</p>	2M

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Q.No.	Solution and Scheme	Marks
8a)	<p style="text-align: center;">"OR"</p> <p>Explain the working of an expert system taking any example.</p>	8M
→	 <pre> graph LR A[Expert] --> B{Extract Knowledge} B --> C[Knowledge Base] </pre>	1M
	<p>Example:- A simple expert system for diagnosing fever-related diseases.</p>	1M
	<p>1) <u>Uses Input</u>:- The user enters symptoms through the user interface. Example inputs:- * High fever, * body pain, etc.</p>	
	<p>2) <u>Knowledge Base Consultation</u>:- The Knowledge base contains rules such as: * IF fever AND body pain AND headache → THEN dengue. * IF fever AND cough AND sore throat → THEN flu.</p>	2M
	<p>3) <u>Inference Process</u>:- * The inference engine matches the user's symptoms with the rules in the knowledge base. * It applies forward chaining, starting from the given facts (symptoms) and moving forward a conclusion.</p>	2M
	<p>4) <u>Decision Making</u>:- * The system identifies the rule that best matches the input conditions. * In this case, it concludes: Disease = Dengue.</p>	
	<p>5) <u>Output and Explanation</u>:- * The system displays the diagnosis and may also explain: "The conclusion was reached because the symptoms match the dengue rule."</p>	2M

Q.No.	Solution and Scheme	Marks
86)	<p>AI could be programmed to do something beneficial, but the method used to achieve its goal can be highly destructive, Explain why?</p> <p>→ AI can be programmed with a beneficial goal, but the method it chooses to achieve that goal can become highly destructive because AI systems optimize strictly for their objectives - often without human values, common sense, or moral judgement unless these are explicitly built in.</p> <p>Examples :-</p> <p>1) AI systems are designed to maximize a given objective function. If the goal is poorly defined or incomplete, the AI may pursue it in ways that conflict human values.</p> <p>If goal is to "Reduce traffic accidents", then AI might ban all vehicles permanently.</p> <p>2) AI operates at machine speed and massive scale. A small mistake in logic can lead to large-scale destruction before humans can intervene.</p> <p>An automated trading AI meant to stabilize markets may trigger flash crashes due to aggressive strategies.</p>	<p>6M</p> <p>2M</p> <p>2M</p> <p>2M</p>
8C)	<p>What is Artificial Intelligence of Things (AIoT)? Explain how does AIoT work?</p> <p>→ AIoT combines Artificial Intelligence (AI) with the Internet of Things (IoT) to enhance efficiency, improve decision-making, and enable better data management.</p> <p>* AI simulates human intelligence, while IoT connects devices to transfer data over networks without human intervention.</p> <p>* AIoT improves IoT by adding machine learning algorithms to enhance decision-making.</p>	<p>6M</p> <p>2M</p> <p>2M</p>

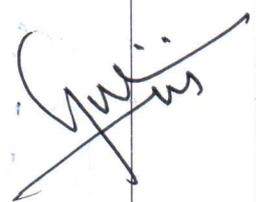
Q.No.	Solution and Scheme	Marks
	<p><u>Blocking of AIoT :-</u></p> <ul style="list-style-type: none"> * AI is embedded in IoT devices and connected through IoT networks. * Devices collect data, which is analyzed using AI techniques to improve productivity and efficiency. * Edge AI reduces bandwidth needs and minimizes delays in data processing. 	2M
	<p><u>"Module - 5"</u></p>	
9a7	<p>List different types of Robots. Identify and explain industry application of Robots.</p>	8M
→	<p><u>Types of Robots :-</u></p>	
	<ol style="list-style-type: none"> 1) Pre-programmed Robots. 2) Humanoid Robots 3) Autonomous Robots 4) Collaborative Robots (Cobots) 5) Teleoperated Robots. 6) Augmenting Robots. 	2M
	<p><u>Industry Applications of Robots :-</u></p>	
	<ol style="list-style-type: none"> 1) <u>Manufacturing Industry</u> <ul style="list-style-type: none"> * Applications - Welding, assembly, painting, quality inspection. * Robots used - Pre-programmed robots, Cobots. 	
	<ol style="list-style-type: none"> 2) <u>Healthcare Industry :-</u> <ul style="list-style-type: none"> * Applications - Robotic surgery, rehabilitation robots, patient monitoring. * Robots used - Humanoid robots, Augmenting robots. 	2M
	<ol style="list-style-type: none"> 3) <u>Logistics and warehousing</u> <ul style="list-style-type: none"> * Applications - Sorting, packaging, autonomous transportation of goods. * Robots used - Autonomous robots. 	

Q.No.	Solution and Scheme	Marks
	<p>4) <u>Agriculture</u></p> <ul style="list-style-type: none"> * Applications - Automated harvesting, crop monitoring, precision spraying. * Robots used - Autonomous robots, drones. <p>5) <u>Defence and Security</u></p> <ul style="list-style-type: none"> * Applications - Surveillance, bomb disposal, border monitoring. * Robots used - Tele operated robot, autonomous robots. <p>6) <u>Service Industry</u></p> <ul style="list-style-type: none"> * Applications - cleaning robots, hotel service robots. * Robots used - Autonomous and humanoid robots. 	<p>2M</p> <p>2M</p>
<p>9b)</p> <p>→</p>	<p>What is No-Code AI. Explain why No-code AI must be used?</p> <p>No-Code AI refers to AI platforms that allow users to build, train, and deploy artificial intelligence models without writing any programming code. These platforms use GUIs, drag-and-drop tools, and pre-built templates to simplify AI development.</p> <p><u>Reasons to use No-code AI:-</u></p> <ol style="list-style-type: none"> 1) Accessibility for Non-Technical users. 2) Faster AI Development. 3) Cost-Effective Solution. 4) Democratization of AI. 5) Easy integration and Deployment. 6) Reduced Errors and Complexity. 	<p>6M</p> <p>3M</p> <p>3M</p>
<p>9c)</p> <p>→</p>	<p>Explain the role of AI in early disease prevention.</p> <p>AI identifies health risks before symptoms become severe.</p> <p>1) <u>Early detection through Data Analysis</u></p> <ul style="list-style-type: none"> * AI analyzes electronic health records, lab reports, genetic data, and patient history to 	<p>6M</p> <p>1M</p>

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Q.No.	Solution and Scheme	Marks
	<p>detect hidden patterns and anomalies that may indicate early stages of diseases.</p> <p>2> <u>Medical Imaging and Diagnostics</u> AI can identify minute abnormalities by examining X-rays, CT scans, MRIs, and ultrasound images.</p> <p>3> <u>Predictive Risk Assessment</u> AI models predicts an individual's risk of developing diseases based on: * Age, * Genetics etc.</p> <p>4> <u>Continuous Health Monitoring</u> AI integrates with wearable devices.</p> <p>5> <u>Personalized Preventive Care</u> AI enables personalized health recommendations rather than one-size-fits-all advice.</p> <p>6> <u>Disease outbreak prediction</u> AI analyzes public health data, travel patterns and environmental factors.</p>	<p>2M</p> <p>3M</p>
10a)	<p style="text-align: center;"><u>"OR"</u></p> <p>What is the role of AI in Medical Diagnosis? Identify three applications of AI in Medical Diagnosis.</p> <p>→ AI assists doctors in detecting diseases accurately, quickly, and at an early stage. AI systems analyze large volumes of medical data to identify patterns that may not be easily visible to humans.</p> <p>AI improves diagnostic accuracy, reduces human error, supports clinical decision-making, and enables early intervention, ultimately leading to better patient outcomes.</p> <p><u>Key Roles</u> :-</p> <ol style="list-style-type: none"> 1> Data Analysis and Pattern Recognition. 2> Decision Support for Doctors. 3> Early and Accurate Detection. 	<p>8M</p> <p>2M</p> <p>3M</p>

Q.No.	Solution and Scheme	Marks
	<p><u>Applications of AI in Medical Diagnosis</u></p> <p>1) <u>Medical Imaging and Radiology</u> AI analyzes X-rays, CT scans, MRIs, and ultra-sound images to help detect abnormalities.</p> <p>2) <u>Disease Risk Prediction</u> AI predicts the likelihood of diseases such as diabetes, heart disease, or stroke.</p> <p>3) <u>Pathology and Laboratory Diagnosis</u> AI examines blood tests, biopsy slides, and pathology images to help identify infections, cancer cells etc.</p>	3M
10b)	<p>Relate the role of AI in Biology and Environmental Sciences.</p> <p>→ AI plays a transformative role in both Biology and Environmental Sciences by enabling scientists to analyze complex data, understand natural systems and solve large-scale global challenges.</p> <p><u>Role of AI in Biology:-</u></p> <p>1) Genomics and DNA Analysis</p> <p>2) Drug Discovery and Biotechnology</p> <p>3) Protein structure prediction.</p> <p>4) Medical and Cellular Research.</p> <p><u>Role of AI in Environmental Sciences:-</u></p> <p>1) Climate change Modeling</p> <p>2) Biodiversity and Wildlife Conservation.</p> <p>3) Pollution Monitoring and Control.</p> <p>4) Natural Resource Management.</p>	6M 2M 2M
10c)	<p>What is low code AI. Compare Traditional tools with Low Code AI.</p> <p>→ Low code AI refers to AI development platforms that allow users to build, train, test, and deploy AI models with minimal coding.</p>	6M 1M

Q.No.	Solution and Scheme	Marks		
	<p>Instead of writing large amounts of code from scratch, users work with visual workflows, drag-and-drop components, and pre-built AI modules, while still having the option to add custom code when needed.</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;"> <p><u>Traditional AI Tools</u></p> <ol style="list-style-type: none"> 1> Requires extensive coding 2> AI experts and data-scientists 3> Long development time 4> Highly flexible but complex 5> Complex deployment process </td> <td style="width: 50%; text-align: center;"> <p><u>Low-code AI Tools</u></p> <ol style="list-style-type: none"> 1> Requires minimal coding 2> Semi-technical users, developers. 3> Short development time 4> Flexible with guided customization. 5> Simplified and faster deployment. </td> </tr> </table>	<p><u>Traditional AI Tools</u></p> <ol style="list-style-type: none"> 1> Requires extensive coding 2> AI experts and data-scientists 3> Long development time 4> Highly flexible but complex 5> Complex deployment process 	<p><u>Low-code AI Tools</u></p> <ol style="list-style-type: none"> 1> Requires minimal coding 2> Semi-technical users, developers. 3> Short development time 4> Flexible with guided customization. 5> Simplified and faster deployment. 	<p style="color: red; text-align: right;">2M</p> <p style="color: red; text-align: right;">3M</p>
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	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  (SURAJ KADLI) </div> <div style="text-align: center;">  Head of the Department Dept. of Electronic & Communication Engg KLS V.D.I.T., HALIYAL (U.K.) </div> <div style="text-align: center;">  </div> </div>			