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Internal Assessment Test 1 – Nov. 2025

Sub:	Introduction to AI & Applications	Subject Code:	1BAIA103	Branch:	AI & DS
Date:	07.11.2025	Duration: 90 min	Marks: 50	Sem: I	

Sl.	Answer any FIVE FULL Questions	Marks	CO	RBT
1 a) 1 b)	Define Artificial Intelligence. Write its few advantages and disadvantages. Differentiate Human and Machine Intelligence.	5 + 5	CO1	L1 L2
2 a)	What are the different types of agents? Explain with a proper diagram.	10	CO1	L2
3 a) 3 b)	What knowledge needs to be represented in an AI system? Broadly classify the types of knowledge.	5 + 5	CO3	L1 L2
4	Explain Informed and Uninformed Search algorithms with one example.	10	CO3	L2

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5 a) 5 b)	Define prompt engineering and explain the Future of Large Language Models (LLMs). What are zero-shot, one-shot, and few-shot prompts? Give simple examples.	5 + 5	CO3	L2 L2
6	Explain the types of prompts used in prompt engineering and discuss what makes a good prompt. Illustrate your answer with examples.	10	CO4	L2
7	Describe the role of instruction prompts in prompt engineering and explain how they guide AI models to perform specific tasks.	10	CO4	L2

CI CCI HOD

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CI CCI HOD

Answer key

Question 1

a) Define Artificial Intelligence. Write its few advantages and disadvantages.

[10 marks]

Answer: Definition: Artificial Intelligence (AI) is the science and engineering of making intelligent machines that can think and act like humans. It enables machines to learn, reason, perceive, communicate, and make decisions similar to human beings.

Advantages:

1. High Accuracy: AI reduces human errors in data processing and decision-making.

2. 24/7 Availability: Machines can work continuously without fatigue.

3. Faster Computation: AI processes large data sets quickly and efficiently**.**

Disadvantages:

1. High Implementation Cost: Requires expensive hardware and skilled manpower.

2. Job Displacement: Automation reduces human involvement in repetitive tasks.

3. Lack of Creativity: AI cannot replicate human emotions or creative thinking.

b) Differentiate Human and Machine Intelligence.

Human Intelligence	Machine Intelligence
Natural ability to think and learn from experiences.	Achieved through programming, data, and algorithms.
Flexible and adapts to new environments easily.	Limited to the tasks it is trained for.
Shows emotions, creativity, and intuition.	Works logically; lacks emotions and creativity.
Learns slowly through experiences.	Learns quickly from large datasets.
Can make ethical and moral decisions.	Cannot understand ethics unless programmed.

Question 2

What are the different types of agents? Explain with a proper diagram.
[10 marks]

Answer: 1. Simple Reflex Agent

Definition: Acts based only on the current percept.

Diagram:

Percept → Condition–Action Rules → Action

Explanation: Acts if a rule matches. Example: Thermostat.

2. Model-Based Reflex Agent

Definition: Uses internal model (memory) to track world state.

Diagram:

Percept → Model Update → Action Rule → Action

Explanation: Stores past data. Example: Self-driving car.

3. Goal-Based Agent

Definition: Chooses actions based on achieving a goal.

Diagram:

Percept + Goal → Decision → Action

Explanation: Moves towards goal. Example: GPS navigation.

4. Utility-Based Agent

Definition: Selects action with highest utility (best outcome).

Diagram:

Percept → Utility Evaluation → Best Action

Explanation: Chooses most beneficial action. Example: route optimizer.

5. Learning Agent

Definition: Improves performance over time using feedback.

Diagram:

Percept → Learning → Action (with Feedback)

Explanation: Learns from experience. Example: voice assistants.

Question 3

a) What knowledge needs to be represented in an AI system?
[5 marks]

Humans have intuition, intentions, prejudices, beliefs, judgments, common sense, etc. apart from knowledge about certain facts. We need to incorporate all this information in a machine-understandable format and make the AI system truly intelligent. For this, we need to represent the following knowledge in AI systems:

1. Object: Information and facts about all objects (relevant in context). For example, in a self-driving car, vehicles and roads are objects.
2. Events: Information and facts about actions which occur in the real world. For example, in a self-driving car, an event can be applying breaks when an object comes in front of it.
3. Performance: The manner in which actions are performed. It describes the behaviour related to how to do things.
4. Meta-knowledge: It is the knowledge about knowledge (what we know).
5. Facts: Facts are the truths about the real world that needs to be represented for an intelligent agent.
6. Knowledge base: It is the most important component of a knowledge-based agent that stores a group of sentences (technical sentences, not simple English language ones).

b) Broadly classify the types of knowledge.
[5 marks]

Five types of knowledge enumerated as follows:

1. Meta knowledge is the knowledge about knowledge.

2. Heuristic knowledge is the knowledge about a specific topic. For example, it can be knowledge of some experts in a filed or subject. Heuristic knowledge is treated as the rule of thumb as it is based on previous experiences and awareness of approaches, which are good to work but not guaranteed.

3. Procedural knowledge, also known as imperative knowledge, gives information about how to achieve or do something. This knowledge includes rules, strategies, procedures, agendas, etc. that can be directly applied to perform any task.

4. Declarative knowledge is the information that we have about an object. This knowledge helps us to describe a particular concept, fact, object and its attributes. Declarative knowledge is simpler than procedural language and is also called descriptive knowledge as it is usually represented using declarative sentences.

5. Structural knowledge is the basic knowledge to solve complex problems. It describes relationships between various concepts or objects such as kind of, part of, and grouping of something.

Question 4

Explain Informed and Uninformed Search algorithms with one example.

[5 marks]

Informed Search (Heuristic Search)

Definition:

Informed search algorithms use extra information (heuristics) to find the goal faster and more efficiently. A heuristic is a rule of thumb that estimates how close a state is to the goal. It helps the search make smarter decisions.

Examples of Informed Search Algorithms

Algorithm	Strategy
Greedy Best-First Search	Chooses node that seems closest to goal
A* (A-star)	Uses both path cost and heuristic

Uninformed Search (Blind Search)

Definition:

Uninformed search algorithms do not have any extra knowledge about the goal or the distance to it. They only know:

- The initial state
- The actions available
- The goal test
- The path cost

Examples of Uninformed Search Algorithms

Algorithm	Strategy
Breadth-First Search (BFS)	Explores shallowest node first
Depth-First Search (DFS)	Explores deepest node first
Depth-Limited Search (DLS)	DFS with depth limit
Iterative Deepening Search (IDS)	Repeated DLS
Uniform Cost Search (UCS)	Lowest path cost first

Question 5

a) Define prompt engineering and explain the Future of Large Language Models (LLMs).

[5 marks]

A prompt is a set of instructions or input given to an AI model (like ChatGPT) to get a specific response or output. **1 mark**

As Large Language Model (LLM) technology advances, the way humans interact with AI systems is set to transform dramatically. Prompt engineering will continue to evolve, focusing on making communication with AI models more intuitive, adaptive, and contextually aware. **1 mark**

Emerging Trends in AI-Driven Communication **3 Mark**

1. **AI-Powered Negotiation Tools**

- Description: AI assists in real-time negotiations by suggesting balanced solutions for win-win agreements.
- Example: An AI system helping professionals reach fair deals during business meetings by suggesting compromises.
- Impact: Enhances fairness, efficiency, and objectivity in decision-making.

2. **Real-Time Language Translation**

- Description: LLMs translate languages with cultural understanding and contextual accuracy.
- Example: Seamless cross-lingual communication in global business meetings.
- Impact: Breaks down communication barriers, enabling truly global collaboration.

3. **Customized News Updates**

- Description: AI curates personalized news feeds based on user interests and preferences.
- Example: A news feed focusing on environmental or technological topics relevant to the reader.
- Impact: Increases engagement and relevance of information consumption.

4. **Automated Prompt Generation**

- Description: AI systems generate optimized prompts for various tasks automatically.
- Example: Auto-creating prompts for research or content creation based on brief task descriptions.
- Impact: Saves time and improves productivity by reducing the need for manual input.

5. **Adaptive Prompts**

- Description: Prompts evolve dynamically based on user behavior and interaction history.
- Example: An AI assistant refining its responses and suggestions based on prior conversations.
- Impact: Leads to highly personalized and efficient AI-human communication.

6. **Subtle Cues for Complex Tasks**

- Description: AI interprets subtle user cues to handle multi-step, nuanced tasks seamlessly.
- Example: Managing complex creative projects with minimal instructions.
- Impact: Makes AI behavior feel natural and human-like in collaborative settings.

b) What are zero-shot, one-shot, and few-shot prompts? Give simple examples.

[5 marks]

Zero-Shot Prompting

Definition:

In Zero-Shot Prompting, the model is given a task without any examples or demonstrations. The model uses its pre-trained knowledge and understanding to perform the task based solely on the instruction.

Example:

Prompt: Classify the sentiment of the following text as positive, negative or neutral.

Text: I think the vacation was okay.

Response: Neutral

One-Shot Prompting

Definition:

In One-Shot Prompting, the model is given one example before the actual task. This example helps the model understand the format or pattern it should follow in its response.

Example:

Prompt: Example: Translate this sentence into French.

English: Good morning → French: Bonjour

Now translate this:

English: How are you?

Response:

French: Comment ça va?

Few-Shot Prompting

Definition:

In Few-Shot Prompting, the model is given a few examples (typically 2–5 or more) before the actual query. The examples help the model learn the pattern or context better, improving the accuracy and relevance of its response.

Example:

Prompt: Translate the following sentences into French:

English: Thank you → French: Merci

English: See you later → French: À plus tard

English: Good night → French: Bonne nuit

Now translate this:

English: I am happy

Response:

French: Je suis heureux (or heureuse)

Question 6

Explain the types of prompts used in prompt engineering and discuss what makes a good prompt. Illustrate your answer with examples.

[10 marks]

Marks Distribution (10 Marks Example)

Component	Marks
Types of prompts (Definitions & Explanation)	4
Qualities of a good prompt (Criteria)	3
Examples (for each type & quality)	3

Types of Prompts (4 marks)

1. **Natural Language Prompts**

   These prompts are written in standard human language and allow intuitive interaction with the AI.

Example: "Can you explain how photosynthesis works?" yields a clear factual answer.

2. **System Prompts**
   System prompts are pre-written templates or instructions that direct the AI's response for format, style, or tone. Example: "Write a formal email explaining the delay in project delivery." The output will be structured as an email.[1][2]

3. **Conditional Prompts**
   These prompts set rules or conditions for the AI to follow. Example: "If the user asks about weather, provide a weather update. If the user asks about sports, provide sports news." The AI tailors its answer according to scenario-specific instructions.[2][1]

4. **Zero-shot, One-shot, and Few-shot Prompts**
   - **Zero-shot:** The prompt gives no example or prior context.
     E.g., "Write a poem about nature." The AI relies on general training data to produce an answer.
   - **One-shot:** The prompt includes one example to guide the response.
     E.g., "Summarize this paragraph: The sun rises in the east and sets in the west."
   - **Few-shot:** The prompt provides several examples to yield a more accurate answer.
     E.g., "Write a product review based on these features: Battery life 10 hours, Camera 12 MP, Screen 6.5 inches.".[1][2]

5. **Self-consistency Prompts**
   This technique ensures logical coherence across answers by asking the model to maintain factual or contextual consistency. Example: "Climate change is driven by fossil fuels. Using this, explain its impact on ecosystems." The AI aligns its response with the given facts.[2][1]

What Makes a Good Prompt? (3 marks)

A good prompt must fulfill these criteria:

- **Clarity**: The prompt should be clear and unambiguous, specifying the task.
  E.g., "Write a short story about a dragon and a knight who become friends."
  Vague example: "Tell me about dragons." (produces generic output).

- **Specificity and Detail**: Provide explicit details or requirements that guide the AI.
  E.g., "Write a poem about the joy of summer, highlighting the beach and sunshine.".
- **Examples or Format**: If expecting a specific output style, include an example in the prompt.
  E.g., "Summarize the following article in bullet points."
- **Iterative Refinement**: A good prompt is often the result of experimentation and refinement—adjusting wording, context, and samples until the answer meets expectations.

Illustrative Examples (3 marks)

Type/Quality	Example Prompt	Expected Output
Natural Language	"Can you explain how photosynthesis works?"	Factual explanation of photosynthesis[2]
System Prompt	"Write a formal email about project delay."	Complete formal email[2]
Conditional	"If user asks about weather, give weather update."	Weather report[2]
Zero-shot	"Write a poem about nature."	Generic poem[1]
One-shot	"Summarize: The sun rises in the east and sets west."	Summary sentence[1]
Few-shot	"Review features: Battery 10h, Camera 12MP."	Detailed product review[1]
Self-consistency	Include a fact: "Climate change = fossil fuels."	Consistent factual explanation[1][2]
Good Prompt	"Write a story about a dragon and knight friends."	Focused, relevant narrative[1][2]
Bad Prompt	"Tell me about dragons."	Unfocused, general answer[1][2]

Question 7

Describe the role of instruction prompts in prompt engineering and explain how they guide AI models to perform specific tasks.

[10 marks]

Marks Distribution

Aspect	Marks
Role of Instruction Prompts	4
How Instruction Prompts Guide AI Models	4
Examples and Illustration	2

Role of Instruction Prompts (4 Marks)

Instruction prompts play a vital role in prompt engineering by providing explicit and clear guidelines to AI models, particularly large language models (LLMs), on how to perform specific tasks. These prompts act as direct instructions that shape the AI's behavior, ensuring the generated responses align closely with the desired objectives and task requirements. By using instruction prompts, users can control the style, tone, and content of the AI output for diverse applications ranging from customer service to legal documents and product reviews.

Instruction prompts help clarify task expectations, reduce ambiguity, and improve the relevance and quality of generated responses. They enable the AI to understand what is expected, such as producing professional, unbiased, or legally compliant content, thereby enhancing the precision of AI-generated text.

How Instruction Prompts Guide AI Models (4 Marks)

Instruction prompts guide AI models to perform specific tasks through a structured process. First, clear and unambiguous instructions are provided, specifying the approach or style needed. For example, an instruction prompt may ask the AI to "write a formal email apologizing for a delayed response" or "create a non-disclosure agreement following legal standards." The AI follows these instructions to tailor its output accordingly. Additionally, instruction prompts often include details or conditions that help the AI focus on particular aspects of the task, such as accuracy, tone, or format.

An important feature of instruction prompts is their ability to be combined with other techniques like role prompting or seed-word prompting for finer control over the model's output. This helps generate responses that are not only relevant but also context-aware and aligned with user expectations.

Examples and Illustration (2 Marks)

- **Customer Service:** Instruction – "Responses should be professional and provide accurate information."
  Result: The AI generates formal and helpful replies to customer queries.
- **Legal Documents:** Instruction – "The document should comply with relevant laws and regulations."
  Result: Ensures the text meets legal standards and formal requirements.
- **Product Reviews:** Instruction – "Write an unbiased and informative review for the new smartphone."
  Result: Produces a balanced and detailed product review by combining instructions with contextual cues.