

CBSE Class 10 Artificial Intelligence Question Paper 2026 with Solutions

Time Allowed :2 Hour	Maximum Marks :50	Total Questions :21
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. Please read the instructions carefully.
2. This question paper consists of 21 questions in two Sections : Section A and Section B.
3. Section A has Objective type questions, whereas Section B contains Subjective type questions.
4. Out of the given $(5 + 16) = 21$ questions, a candidate has to answer $(5 + 10) = 15$ questions in the allotted (maximum) time of 2 hours.
5. All questions of a particular section must be attempted in the correct order.
6. Section A : Objective Type Questions (24 marks) :
 - (a) This section has 5 questions.
 - (b) There is no negative marking.
 - (c) Do as per the instructions given.
 - (d) Marks allotted are mentioned against each question/part.
7. Section B : Subjective Type Questions (26 marks) :
 - (a) This section has 16 questions.
 - (b) A candidate has to do 10 questions.
 - (c) Do as per the instructions given.
 - (d) Marks allotted are mentioned against each question/part.

1. Define Self-management and explain how it helps in personal and professional growth.

Correct Answer: Self-management is the ability to control one's thoughts, emotions, time, and behavior effectively, helping individuals grow personally and succeed professionally.

Solution:

Step 1: Understanding the Question.

The question asks for a definition of self-management and an explanation of its importance for both personal and professional development.

Step 2: Defining Self-Management.

Self-management is the ability to take control of one's own life by regulating thoughts, feelings, and actions effectively.

It involves several key skills:

- **Time Management:** Organizing and planning how to divide your time between specific activities.
- **Emotional Control:** Managing your emotional responses to situations to remain calm and productive.
- **Goal Setting:** Defining clear objectives and working systematically to achieve them.
- **Accountability:** Taking responsibility for your own actions and their outcomes.

Step 3: Detailed Explanation of its Impact.

A. Role in Personal Growth:

Self-management is fundamental to personal development in the following ways:

- **Builds Discipline:** It helps in developing positive habits and routines, leading to a more structured life.
- **Enhances Confidence:** Successfully managing oneself boosts self-esteem and the belief in one's abilities.
- **Improves Emotional Stability:** By controlling emotions, individuals can handle stress and challenges more effectively.
- **Promotes Well-being:** It helps maintain a healthy work-life balance, reducing burnout.

B. Role in Professional Growth:

In a professional environment, self-management leads to:

- **Increased Productivity:** Effective time management and focus lead to higher efficiency and better output.
- **Greater Reliability:** Individuals who manage themselves well are seen as dependable and trustworthy by colleagues and superiors.

- **Career Advancement:** It is a key leadership quality that helps in taking on more responsibilities and advancing one's career.
- **Stronger Professional Reputation:** Consistency in meeting deadlines and managing tasks builds a positive image.

Step 4: Final Answer.

In conclusion, self-management is the cornerstone of personal and professional success. It empowers individuals to direct their own growth by fostering discipline, improving productivity, and building a foundation for achieving long-term goals.

💡 Quick Tip

Self-management = Managing yourself before managing anything else — time, emotions, and goals.

2. List any four methods or techniques for effective Stress Management.

Correct Answer: Common stress management techniques include exercise, meditation, time management, and relaxation techniques.

Solution:

Step 1: Understanding the Question.

The question asks to list and briefly describe four effective techniques for managing stress.

Step 2: Key Concepts of Stress Management.

Stress management refers to a wide spectrum of techniques and psychotherapies aimed at controlling a person's level of stress, especially chronic stress, for the purpose of improving everyday functioning.

Step 3: Detailed Explanation of Four Techniques.

Here are four common and effective methods for stress management:

1. Physical Exercise:

- **How it works:** Engaging in physical activities like jogging, yoga, swimming, or even a brisk walk helps release endorphins, which are natural mood lifters.
- **Benefit:** It reduces levels of stress hormones like cortisol and helps improve sleep quality, which further reduces stress.

2. Mindfulness and Meditation:

- **How it works:** Techniques like deep breathing exercises and meditation help calm the mind and bring focus to the present moment.
- **Benefit:** This practice helps in detaching from stressful thoughts, reducing anxiety, and promoting a sense of inner peace and relaxation.

3. Effective Time Management:

- **How it works:** Organizing tasks, setting priorities, and creating a schedule can prevent the feeling of being overwhelmed.
- **Benefit:** By managing time effectively, one can avoid last-minute rushes and the stress associated with deadlines, leading to a greater sense of control.

4. Relaxation and Hobbies:

- **How it works:** Dedicating time to enjoyable activities such as reading a book, listening to music, gardening, or painting helps divert the mind from stressors.
- **Benefit:** Hobbies provide a mental break, reduce tension, and contribute to overall happiness and well-being.

Step 4: Final Answer.

Four effective stress management techniques are physical exercise, meditation, time management, and engaging in relaxation hobbies.

Each technique helps to reduce stress by addressing its physical, mental, or emotional aspects.

💡 Quick Tip

Follow the 4R rule: Rest, Relax, Reorganize, and Reconnect to manage stress effectively.

3. What is the difference between Verbal and Non-verbal communication? Give examples.

Correct Answer: Verbal communication uses spoken or written words, while non-verbal communication uses body language, gestures, and facial expressions to convey messages.

Solution:

Step 1: Understanding the Question.

The question asks for the key differences between verbal and non-verbal communication, supported by relevant examples for each.

Step 2: Defining Verbal Communication.

Verbal communication is the use of **words** to share information with other people.

It includes both spoken and written communication.

The primary purpose is to convey a clear, direct, and explicit message.

Examples:

- **Oral Communication:** Face-to-face conversations, phone calls, speeches, video conferences.
- **Written Communication:** Emails, letters, reports, text messages.

Step 3: Defining Non-verbal Communication.

Non-verbal communication is the transmission of messages or signals through a **non-verbal platform** such as eye contact, facial expressions, gestures, posture, and body language.

It often conveys emotions, attitudes, and intentions, and can either support or contradict the verbal message.

Examples:

- **Facial Expressions:** A smile to show happiness or a frown to show disapproval.
- **Gestures:** Waving to say hello, or giving a thumbs-up for approval.
- **Posture:** Standing straight to show confidence, or slouching to indicate boredom.
- **Eye Contact:** Maintaining eye contact to show interest and sincerity.

Step 4: Key Differences Summarized.

The main differences can be highlighted in a table:

Basis of Difference	Verbal Communication	Non-verbal Communication
Medium	Uses spoken or written words.	Uses body language, gestures, expressions.
Nature of Message	Explicit and structured.	Implicit and often unconscious.
Clarity	Generally clear and direct.	Can be ambiguous and open to interpretation.
Purpose	To convey facts and information.	To convey emotions, attitudes, and feelings.

Step 5: Final Answer.

In essence, verbal communication relies on words to convey a message, making it direct and

informational.

In contrast, non-verbal communication uses physical cues to express emotions and attitudes, adding a deeper layer of meaning to interactions.

 Quick Tip

Words speak the message (verbal), but body language reveals the emotion (non-verbal).

4. List any two Green Skills that can contribute to a sustainable environment.

Correct Answer: Examples of green skills include waste management and energy conservation.

Solution:

Step 1: Understanding the Question.

The question requires identifying and explaining two "Green Skills," which are abilities that help in creating and maintaining a sustainable environment.

Step 2: Defining Green Skills.

Green skills are the knowledge, abilities, values, and attitudes needed to live in, develop, and support a sustainable and resource-efficient society.

They are essential for protecting the environment and combating climate change.

Step 3: Detailed Explanation of Two Green Skills.

Two important green skills that contribute to a sustainable environment are:

1. Waste Management and Recycling:

- **What it is:** This skill involves understanding and implementing the principles of the 3Rs: **Reduce**, **Reuse**, and **Recycle**.
- **How it helps:**
 - **Reduce:** Minimizing the amount of waste generated in the first place (e.g., avoiding single-use plastics).
 - **Reuse:** Finding new uses for items instead of discarding them (e.g., using glass jars for storage).
 - **Recycle:** Properly segregating waste (like paper, plastic, glass) so it can be processed into new materials.

- **Contribution:** This practice conserves natural resources, saves energy, and reduces land-fill pollution.

2. Energy Conservation:

- **What it is:** This skill involves using energy resources wisely and efficiently to minimize consumption.
- **How it helps:** It can be practiced through simple habits like:
 - Switching off lights and electronic appliances when not in use.
 - Using energy-efficient appliances (e.g., LED bulbs, 5-star rated ACs).
 - Maximizing the use of natural light and ventilation.
- **Contribution:** Energy conservation reduces the demand on power plants, which in turn lowers greenhouse gas emissions and helps conserve fossil fuels.

Step 4: Final Answer.

Two key green skills for a sustainable environment are waste management, which focuses on reducing, reusing, and recycling, and energy conservation, which involves the efficient use of energy.

Both skills play a critical role in minimizing our environmental footprint.

Quick Tip

Follow the 3R rule: Reduce, Reuse, Recycle — the foundation of most green skills.

5. Explain the three domains of AI: Data Science, Computer Vision (CV), and Natural Language Processing (NLP).

Correct Answer: The three main domains of AI are Data Science (data analysis and predictions), Computer Vision (understanding images and videos), and Natural Language Processing (understanding human language).

Solution:

Step 1: Understanding the Question.

The question asks for an explanation of the three major domains of Artificial Intelligence (AI): Data Science, Computer Vision (CV), and Natural Language Processing (NLP).

Step 2: Detailed Explanation of Each Domain.

AI can be categorized based on the type of data it processes. The three main domains are:

1. Data Science (deals with structured data):

- **Focus:** Data Science is concerned with extracting knowledge and insights from structured or numerical data, often presented in tables, spreadsheets, or databases.
- **Goal:** Its main goal is to find patterns, make predictions, and support decision-making.
- **Techniques:** It uses statistical analysis, machine learning algorithms, and data visualization.
- **Example Applications:** Predicting future sales based on past data, recommending products on e-commerce sites (like Amazon), and detecting fraudulent bank transactions.

2. Computer Vision (CV) (deals with visual data):

- **Focus:** Computer Vision enables machines to "see," interpret, and understand information from images and videos.
- **Goal:** To replicate human vision, allowing computers to identify objects, people, and activities in visual data.
- **Techniques:** It uses image processing, pattern recognition, and deep learning (especially Convolutional Neural Networks).
- **Example Applications:** Face recognition to unlock smartphones, self-driving cars navigating roads, and medical imaging analysis (e.g., detecting tumors in X-rays).

3. Natural Language Processing (NLP) (deals with language data):

- **Focus:** NLP gives machines the ability to understand, interpret, and generate human language, both in text and speech form.
- **Goal:** To bridge the communication gap between humans and computers.
- **Techniques:** It combines computational linguistics with machine learning and deep learning models.

- **Example Applications:** Virtual assistants like Siri and Alexa, real-time language translation (Google Translate), and sentiment analysis of social media comments.

Step 3: Final Answer.

In summary, the three core domains of AI are distinct yet powerful.

Data Science focuses on analyzing numbers and structured data to make predictions.

Computer Vision processes images and videos to enable machines to see.

Natural Language Processing allows machines to understand and respond to human language.

💡 Quick Tip

Think: Numbers → Data Science, Images → Computer Vision, Language → NLP.

6. Differentiate between Script-bots and Smart-bots with relevant examples.

Correct Answer: Script-bots follow predefined rules and scripts, while smart-bots use AI to understand context and respond intelligently.

Solution:

Step 1: Understanding the Question.

The question asks for a clear differentiation between Script-bots and Smart-bots, including examples to illustrate the differences.

Step 2: Explaining Script-bots (Rule-Based Bots).

Script-bots, also known as rule-based chatbots, are the simpler type of bots.

- **Functionality:** They operate based on a predefined script or a set of rules (a decision tree). They can only respond to specific commands or questions they have been programmed to recognize.
- **Intelligence:** They do not have any learning capabilities or understanding of context. If a user's query deviates from the script, the bot usually fails to respond appropriately.
- **Use Case:** They are best suited for simple, repetitive tasks where the conversation flow is predictable.
- **Examples:**
 - **FAQ Bots:** Bots on websites that answer a fixed list of frequently asked questions.

- **Automated IVR Systems:** Telephone menus that guide callers with options like “Press 1 for Sales, Press 2 for Support.”

Step 3: Explaining Smart-bots (AI-Based Bots).

Smart-bots are powered by Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP).

- **Functionality:** They can understand the user’s intent and context, even if the phrasing is not precise. They can handle more complex and natural conversations.
- **Intelligence:** They learn from past interactions and continuously improve their responses over time. They are conversational and can provide personalized answers.
- **Use Case:** Ideal for complex customer service, personal assistance, and dynamic interactions.
- **Examples:**
 - **Virtual Assistants:** Amazon’s Alexa, Apple’s Siri, and Google Assistant, which can understand and execute a wide range of commands.
 - **Advanced Customer Support Chatbots:** Bots that can handle complex queries, process orders, and provide personalized support.

Step 4: Key Differences Summarized.

Feature	Script-bots	Smart-bots
Technology	Rule-based, fixed scripts	AI, ML, and NLP
Flexibility	Rigid and limited	Flexible and adaptive
Learning	Cannot learn or improve	Learns from interactions
Conversation	Structured and predictable	Natural and contextual

Step 5: Final Answer.

The fundamental difference is intelligence: Script-bots are programmed to follow a strict set of rules and cannot handle unexpected inputs, whereas Smart-bots use AI to understand, learn, and engage in more human-like, flexible conversations.

💡 Quick Tip

Script-bots follow scripts, Smart-bots understand intent — intelligence makes the difference.

7. Define Neural Networks and explain the role of input, hidden, and output layers.

Correct Answer: A neural network is a computational model inspired by the human brain that processes data through interconnected layers: input, hidden, and output layers.

Solution:

Step 1: Understanding the Question.

The question asks for a definition of a Neural Network and an explanation of the function of its three fundamental types of layers: input, hidden, and output.

Step 2: Defining a Neural Network.

An Artificial Neural Network (ANN) is an AI model inspired by the structure and function of the human brain's biological neural networks.

It is composed of interconnected processing units called "neurons" or "nodes," which are organized into layers.

These networks learn from data by adjusting the connection strengths (weights) between neurons to recognize patterns and make predictions.

Step 3: Detailed Explanation of the Layers.

A basic neural network consists of at least three types of layers:

1. The Input Layer:

- **Role:** This is the very first layer of the network. Its primary job is to receive the raw input data.
- **Function:** It does not perform any computation. Each neuron in the input layer simply represents a feature of the input data. For example, in an image of a digit, each neuron might correspond to one pixel's intensity value.
- **Analogy:** It acts like the sensory organs (e.g., eyes, ears) of the network, taking in information from the outside world.

2. The Hidden Layer(s):

- **Role:** These layers are located between the input and output layers. A neural network can have one or many hidden layers (networks with multiple hidden layers are called "deep neural networks").
- **Function:** This is where the actual processing and computation happen. Neurons in the hidden layers receive data from the previous layer, apply mathematical transformations (using weights, biases, and an activation function), and pass the result to the next layer.

They are responsible for identifying complex patterns and features in the data that are not immediately obvious.

- **Analogy:** They function like the brain's cortex, processing information and extracting meaningful features.

3. The Output Layer:

- **Role:** This is the final layer of the network. It produces the ultimate result of the computation.
- **Function:** The structure of the output layer depends on the task. For a classification task (e.g., "cat" or "dog"), it might have one neuron for each class. For a regression task (e.g., predicting a house price), it might have a single neuron that outputs a numerical value.
- **Analogy:** It represents the network's final decision or conclusion.

Step 4: Final Answer.

In summary, a neural network processes information in a layered fashion. The **input layer** receives the data, the **hidden layers** perform complex feature extraction and learning, and the **output layer** delivers the final prediction or classification.

💡 Quick Tip

Think of a neural network as a pipeline: Input (data in) → Hidden layers (learning) → Output (prediction).

8. What is the TF-IDF (Term Frequency-Inverse Document Frequency) algorithm used for?

Correct Answer: TF-IDF is used to measure the importance of words in a document relative to a collection of documents, commonly used in text mining and NLP.

Solution:

Step 1: Understanding the Question.

The question asks for the purpose and application of the TF-IDF algorithm in the field of AI and data science.

Step 2: Key Formula or Approach.

TF-IDF stands for Term Frequency–Inverse Document Frequency. It is a numerical statistic

that reflects how important a word is to a document in a collection or corpus. The TF-IDF score is calculated by multiplying two metrics:

$$\text{TF-IDF Score} = \text{TF} \times \text{IDF}$$

Where:

- **Term Frequency (TF):** Measures how frequently a term appears in a single document.

$$\text{TF}(\text{term, document}) = \frac{\text{Number of times term appears in a document}}{\text{Total number of terms in the document}}$$

- **Inverse Document Frequency (IDF):** Measures how important a term is by weighing down common terms (like "the", "is") and scaling up rare terms.

$$\text{IDF}(\text{term}) = \log \left(\frac{\text{Total number of documents}}{\text{Number of documents with the term}} + 1 \right)$$

Step 3: Detailed Explanation of its Purpose.

The primary purpose of TF-IDF is to transform text into a meaningful numerical representation that computers can understand. It achieves this by evaluating the relevance of words.

- **Identifies Important Words:** A high TF-IDF score is assigned to words that appear frequently in a particular document (high TF) but are rare across the entire collection of documents (high IDF). This combination indicates that the word is a significant keyword for that specific document.
- **Filters Out Common Words:** Common words like "a," "an," and "the" appear in almost all documents. They will have a high TF but a very low IDF, resulting in a low TF-IDF score. This effectively filters them out as non-important.
- **Enables Text-based Machine Learning:** By converting text documents into numerical vectors using TF-IDF scores, we can apply machine learning algorithms for various tasks.

Step 4: Applications of TF-IDF.

TF-IDF is a fundamental technique used in:

- **Information Retrieval and Search Engines:** To rank documents based on their relevance to a user's search query.
- **Text Summarization:** To identify key sentences by scoring them based on the TF-IDF values of the words they contain.
- **Document Classification:** To classify documents into different categories (e.g., news articles into sports, politics, etc.).

Step 5: Final Answer.

The TF-IDF algorithm is used to quantify the importance of a word within a document relative to a collection of documents. Its main purpose is to convert textual data into a numerical format, highlighting the most significant keywords while filtering out common words, which is crucial for tasks in Natural Language Processing (NLP) and information retrieval.

💡 Quick Tip

High TF + Rare word across documents = High TF-IDF score (important keyword).

9. How does Data Privacy and AI Ethics impact the development of modern AI systems?

Correct Answer: Data privacy and AI ethics guide the responsible design of AI systems by ensuring user data protection, fairness, transparency, and accountability.

Solution:

Step 1: Understanding the Question.

The question asks how the principles of Data Privacy and AI Ethics influence the way modern AI systems are designed, built, and deployed.

Step 2: The Role of Data Privacy.

Data Privacy refers to the protection of personal data from those who should not have access to it and the ability of individuals to control how their data is collected, used, and shared. Its impact on AI development includes:

- **Constraining Data Collection:** AI systems, especially machine learning models, are data-hungry. Privacy regulations (like GDPR) force developers to collect only necessary data and obtain user consent, shaping the scope and type of AI that can be built.
- **Requiring Secure Technologies:** To protect data, AI systems must incorporate privacy-preserving techniques such as encryption, data anonymization, and differential privacy, which adds complexity to the development process.
- **Building User Trust:** Adherence to data privacy principles is crucial for gaining public trust. Users are more likely to adopt AI systems if they are confident their personal information is safe.

Step 3: The Role of AI Ethics.

AI Ethics is a set of guidelines and principles that ensures AI technology is developed and used in a way that is beneficial and fair to humanity. Its impact includes:

- **Mitigating Bias and Ensuring Fairness:** AI models can inherit biases from their training data, leading to discriminatory outcomes. AI ethics requires developers to actively audit their data and models for bias and implement fairness-aware algorithms.
- **Promoting Transparency and Explainability (XAI):** Many AI models, like deep neural networks, are "black boxes." AI ethics pushes for the development of explainable AI (XAI) so that decisions made by AI systems can be understood, questioned, and trusted by humans.
- **Establishing Accountability:** Ethical guidelines demand clear lines of responsibility. Developers and organizations must be accountable for the actions and consequences of their AI systems, which influences system design to include human oversight and control mechanisms.

Step 4: Combined Impact on AI Development.

Together, data privacy and AI ethics act as a guiding framework for responsible AI innovation. They shift the focus from merely building a powerful and accurate system to building one that is also **safe, fair, transparent, and respectful of human rights**. This means developers must integrate ethical considerations and privacy safeguards into every stage of the AI lifecycle, from initial design and data collection to deployment and ongoing monitoring.

Step 5: Final Answer.

Data privacy and AI ethics fundamentally shape modern AI development by imposing crucial constraints and responsibilities. They compel developers to prioritize user data protection, build fair and unbiased models, ensure transparency in decision-making, and establish accountability for AI outcomes. This leads to the creation of more trustworthy, responsible, and human-centric AI systems.

💡 Quick Tip

Responsible AI = Powerful technology + Strong ethics + Secure data handling.