

# CBSE Class 10 Artificial Intelligence Question Paper with Solutions(Memory Based)

Time Allowed :3 Hour	Maximum Marks :60	Total Questions :24
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## General Instructions

Read the following instructions very carefully and strictly follow them:

- Answers to this Paper must be written on the paper provided separately.
- You will not be allowed to write during the first 15 minutes
- This time is to be spent in reading the question paper.
- The time given at the head of this Paper is the time allowed for writing the answers,
- The paper has four Sections.
- Section A is compulsory - All questions in Section A must be answered.
- You must attempt one question from each of the Sections B, C and D and one other question from any Section of your choice.

**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: Concept:** Self-management refers to the ability to regulate and organize one's own actions, emotions, and responsibilities without constant external supervision. It is an essential life skill for success in both personal and professional domains.

**Step 1: Definition of Self-management.**

Self-management is the process of:

- Managing time effectively
- Controlling emotions and behavior
- Setting goals and staying disciplined
- Taking responsibility for actions

**Step 2: Importance in personal growth.**

- Builds self-discipline and confidence.
- Improves emotional stability.
- Helps develop positive habits.

- Enhances decision-making ability.
- Promotes a balanced lifestyle.

**Step 3: Importance in professional growth.**

- Increases productivity and efficiency.
- Improves reliability and accountability.
- Helps meet deadlines consistently.
- Enhances leadership qualities.
- Builds a professional reputation.

**Step 4: Key components of self-management.**

- Time management
- Stress management
- Goal setting
- Self-motivation
- Adaptability

**Conclusion:**

Self-management is a vital skill that empowers individuals to control their lives, achieve personal goals, and excel professionally by improving discipline, productivity, and emotional intelligence.

**Quick Tip**

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

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**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: Concept:** Stress management involves techniques that help individuals cope with pressure, maintain emotional balance, and improve overall well-being.

**Step 1: Physical Exercise.**

- Regular activities like walking, yoga, or sports reduce stress hormones.
- Improves mood and physical health.

**Step 2: Meditation and Deep Breathing.**

- Helps calm the mind and improve concentration.
- Deep breathing reduces anxiety and promotes relaxation.

**Step 3: Time Management.**

- Planning tasks and setting priorities prevents last-minute pressure.
- Reduces workload-related stress.

**Step 4: Relaxation Techniques.**

- Activities like listening to music, reading, or hobbies.
- Helps refresh the mind and reduce tension.

**Other techniques (optional):**

- Talking to friends or family
- Maintaining a healthy lifestyle
- Proper sleep and nutrition

**Conclusion:**

Effective stress management techniques such as exercise, meditation, proper planning, and relaxation help maintain mental balance and improve overall quality of life.

**Quick Tip**

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

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**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: Concept:** Communication is the process of exchanging information and ideas. It can be broadly divided into:

- Verbal Communication
- Non-verbal Communication

**Step 1: Verbal Communication.**

- Involves the use of **words**.

- Can be spoken or written.
- Clear and direct method of communication.

**Examples:**

- Face-to-face conversations
- Phone calls
- Emails and letters
- Speeches and presentations

**Step 2: Non-verbal Communication.**

- Involves communication **without words**.
- Uses body movements, expressions, and tone.
- Often conveys emotions and attitudes.

**Examples:**

- Facial expressions (smiling, frowning)
- Gestures (waving, thumbs up)
- Eye contact
- Posture and body language

**Step 3: Key Differences.**

<b>Feature</b>	<b>Verbal Communication</b>	<b>Non-verbal Communication</b>
<i>Medium</i>	<i>Words(spoken/written)</i>	<i>Bodylanguage/signals</i>
<i>Clarity</i>	<i>Directandexplicit</i>	<i>Indirectandexpressive</i>
<i>Form</i>	<i>Speech, writing</i>	<i>Gestures, expressions</i>
<i>Purpose</i>	<i>Shareinformationclearly</i>	<i>Conveyemotionsandattitudes</i>

**Conclusion:**

Verbal communication uses words to convey clear messages, while non-verbal communication relies on body language and expressions to support or replace spoken words.

**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: Concept:** Green skills are abilities and practices that help protect the environment and promote sustainability. They encourage responsible use of natural resources and eco-friendly habits.

**Step 1: Waste Management.**

- Involves reducing, reusing, and recycling waste.
- Helps minimize pollution and landfill waste.
- Example: Segregating biodegradable and non-biodegradable waste.

**Step 2: Energy Conservation.**

- Using energy efficiently to reduce consumption.
- Helps conserve natural resources and reduce carbon footprint.
- Example: Switching off lights when not in use, using LED bulbs.

**Other green skills (optional):**

- Water conservation
- Tree plantation
- Sustainable transportation (cycling, public transport)
- Use of renewable energy

**Conclusion:**

Green skills like waste management and energy conservation play an important role in protecting the environment and promoting a sustainable future.

#### Quick Tip

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

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**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: Concept:** Artificial Intelligence (AI) is divided into different domains based on the type of data and tasks involved. The three major domains are:

- Data Science
- Computer Vision (CV)

- Natural Language Processing (NLP)

### Step 1: Data Science.

- Deals with **structured data** like numbers, tables, and statistics.
- Focuses on extracting insights and making predictions.
- Uses techniques like data analysis, machine learning, and visualization.

#### Applications:

- Sales prediction
- Recommendation systems (Netflix, Amazon)
- Fraud detection
- Weather forecasting

### Step 2: Computer Vision (CV).

- Enables machines to **see and interpret visual data**.
- Works with images and videos.
- Uses deep learning and image processing techniques.

#### Applications:

- Face recognition
- Self-driving cars
- Medical image analysis
- Object detection (CCTV surveillance)

### Step 3: Natural Language Processing (NLP).

- Allows machines to **understand and generate human language**.
- Works with text and speech data.
- Combines linguistics and machine learning.

#### Applications:

- Chatbots and virtual assistants
- Language translation (Google Translate)
- Sentiment analysis
- Speech recognition

**Step 4: Comparison of domains.**

Domain	Data Type	Focus	Example
<i>DataScience</i>	<i>Structureddata</i>	<i>Analysis&amp;prediction</i>	<i>Salesforecasting</i>
<i>ComputerVision</i>	<i>Images/Videos</i>	<i>Visualunderstanding</i>	<i>Facedetection</i>
<i>NLP</i>	<i>Text/Speech</i>	<i>Languageprocessing</i>	<i>Chatbots</i>

**Conclusion:**

Data Science analyzes numerical data, Computer Vision interprets visual content, and NLP enables machines to understand human language — together forming the core domains of AI.

**Quick Tip**

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

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**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: Concept:** Bots are automated programs that interact with users. Based on intelligence level, they are categorized into:

- Script-bots (Rule-based bots)
- Smart-bots (AI-based bots)

**Step 1: Script-bots.**

- Work on **predefined rules and scripts.**
- Follow fixed decision trees.
- Cannot understand context beyond programmed responses.
- Limited flexibility and learning ability.

**Examples:**

- Basic website chat support
- Automated IVR systems
- FAQ bots

**Step 2: Smart-bots.**

- Powered by **Artificial Intelligence and Machine Learning.**
- Understand context and intent.
- Can learn and improve over time.

- Provide more natural and personalized responses.

**Examples:**

- Virtual assistants (Alexa, Siri, Google Assistant)
- AI chatbots (customer support AI)
- Conversational AI tools

**Step 3: Key Differences.**

<b>Feature</b>	<b>Script-bots</b>	<b>Smart-bots</b>
<i>Technology</i>	<i>Rule – based</i>	<i>AI – based</i>
<i>Learningability</i>	<i>No learning</i>	<i>Learns from data</i>
<i>Flexibility</i>	<i>Limited</i>	<i>Highly flexible</i>
<i>Conversation style</i>	<i>Predefined</i>	<i>Natural and contextual</i>

**Conclusion:**

Script-bots are simple rule-based programs suitable for basic automation, while smart-bots use AI to understand users better and provide intelligent, adaptive interactions.

**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: Concept:** Artificial Neural Networks (ANNs) are machine learning models inspired by biological neurons. They consist of interconnected nodes (neurons) arranged in layers that process and transform data.

**Step 1: Definition of Neural Networks.**

A neural network is a system of interconnected neurons that:

- Receives input data
- Processes it through weighted connections
- Produces an output (prediction or classification)

**Step 2: Input Layer.**

- The **first layer** of the network.
- Receives raw data (features).
- Each neuron represents one input variable.

**Example:** In image recognition, input neurons may represent pixel values.

**Step 3: Hidden Layers.**

- Located between input and output layers.
- Perform **feature extraction and transformation**.
- Apply weights, biases, and activation functions.
- Can be one or multiple layers (deep learning).

**Role:**

- Learn complex patterns
- Detect relationships in data

**Step 4: Output Layer.**

- The **final layer** of the network.
- Produces the result or prediction.
- Number of neurons depends on task:
  - 1 neuron → Binary classification
  - Multiple neurons → Multi-class classification

**Step 5: Overall working.**

- Input data enters through input layer.
- Hidden layers process and learn patterns.
- Output layer generates final prediction.

**Conclusion:**

Neural networks process data through layered structures where the input layer receives data, hidden layers learn patterns, and the output layer produces predictions or decisions.

#### Quick Tip

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

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**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: Concept:** TF-IDF (Term Frequency–Inverse Document Frequency) is a statistical technique used in:

- Natural Language Processing (NLP)
- Information retrieval
- Text mining

It helps determine how important a word is in a document compared to a collection of documents (corpus).

**Step 1: Term Frequency (TF).**

- Measures how often a word appears in a document.
- Higher frequency → More importance in that document.

$$TF = \frac{\text{Number of times term appears in document}}{\text{Total number of terms in document}}$$

**Step 2: Inverse Document Frequency (IDF).**

- Measures how rare a word is across all documents.
- Rare words get higher importance.
- Common words (like "the", "is") get lower weight.

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

**Step 3: TF-IDF Calculation.**

$$TF-IDF = TF \times IDF$$

This gives a score indicating the importance of a word in a document.

**Step 4: Purpose of TF-IDF.**

- Identifies important keywords in documents.
- Removes common but less meaningful words.
- Converts text into numerical form for machine learning.

**Step 5: Applications.**

- Search engines (ranking results)
- Document classification
- Chatbots and NLP models
- Spam detection

**Conclusion:**

TF-IDF is used to evaluate the importance of words in text by combining frequency within a document and rarity across documents, making it a key technique in NLP and text analysis.

**Quick Tip**

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

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**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: Concept:** Modern AI systems rely heavily on data, making data privacy and ethical considerations crucial. They ensure that AI technologies are safe, fair, and trustworthy.

**Step 1: Impact of Data Privacy.**

Data privacy focuses on protecting users' personal information.

- Prevents unauthorized data access or misuse.
- Encourages secure data collection and storage.
- Promotes compliance with regulations (like GDPR).
- Builds user trust in AI systems.

**Step 2: Role of AI Ethics.**

AI ethics ensures that AI systems are developed responsibly.

- Prevents bias and discrimination.
- Promotes fairness and inclusivity.
- Encourages transparency in decision-making.
- Ensures accountability for AI outcomes.

**Step 3: Influence on AI Development.**

- Ethical guidelines shape data collection methods.
- Developers adopt privacy-preserving techniques (encryption, anonymization).
- AI models are audited for bias and fairness.
- Human oversight is included in critical decisions.

**Step 4: Challenges.**

- Balancing innovation with privacy.

- Managing large-scale sensitive data.
- Avoiding algorithmic bias.
- Ensuring global regulatory compliance.

**Step 5: Importance in modern society.**

- Protects user rights and dignity.
- Prevents misuse of AI technologies.
- Encourages responsible AI adoption.

**Conclusion:**

Data privacy and AI ethics play a vital role in shaping modern AI systems by ensuring secure data usage, fairness, transparency, and responsible innovation.

**Quick Tip**

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

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