

PRACTICE PAPER 5
CLASS IX
ARTIFICIAL INTELLIGENCE (CODE 417)
(SOLUTIONS)

1. (i) Interpersonal Skills
(iii) (c) A is true but R is false.
(v) entrepreneur
- (ii) (a) Encoding
(iv) (c) Upcycle
(vi) (a) Memory Management
2. (i) (c) A is true but R is false.
(ii) (d) Human imagination
(iii) (a) Both Statement 1 and Statement 2 are correct.
(iv) (d) All of these
(v) (b) Computer Vision
(vi) (a) Generative Adversarial Networks (GANs)
3. (i) (b) Computer Vision
(ii) most frequently
(iii) (d) All of these
(iv) (c) Dictionary
(v) (c) Extensive libraries and simplicity
(vi) (c) Composing music in a specific style
4. (i) (d) `\\`
(ii) (a) Both Statement 1 and Statement 2 are correct.
(iii) (b) Presenting data using charts, graphs and infographics
(iv) (b) To explain code logic
(v) (d) Decision Trees
(vi) (c) `# This is a comment`
5. (i) (c) Both (a) and (b)
(ii) (b) `-1`
(iii) (b) `num = 42`
(iv) Generative
(v) (a) Learning to frame questions that can be answered using data
(vi) (c) Artificial General Intelligence (AGI)
6. Verbal communication involves spoken or written words, e.g., conversations, emails, etc. Non-verbal communication uses gestures, facial expressions or body language, e.g., a nod or a smile.
Both forms complement each other to ensure effective communication.
7. The following are the different types of businesses that vary based on ownership and structure:
 - (a) **Proprietorship**: Owned by one individual.
 - (b) **Partnership**: Shared ownership among partners.
 - (c) **Corporation**: Legal entity that is separate from owners.
 - (d) **Joint Hindu Family**: Family-owned business.
8. Living (Biotic) components refer to living organisms, e.g., plants, animals and microbes. Non-Living (Abiotic) components refer to non-living factors, e.g., sunlight, air, water and soil.
Both interact to maintain the ecological balance.

9. 7Cs of effective communication are:

- (a) Clarity
- (b) Conciseness
- (c) Concreteness
- (d) Correctness
- (e) Consideration
- (f) Completeness
- (g) Courtesy

These principles ensure messages are clear and impactful.

10. Symptoms of stress include:

- (a) **Physical symptoms:** Fatigue, headaches
- (b) **Emotional symptoms:** Irritability, anxiety
- (c) **Behavioural changes:** Overeating, withdrawal

Recognizing these symptoms helps in managing stress effectively.

11. Decision trees are unsuitable for highly complex data or datasets with many categories as they may overfit or oversimplify results. For such cases, more robust models like Random Forest or Neural Networks are better.

12. Numerical and categorical data can be categorized in the following ways:

- (a) **Numerical Data:** It represents quantities, *e.g.*, age, height.
- (b) **Categorical Data:** It represents groups or labels, *e.g.*, gender, color.

Both are essential for data analysis and visualization.

13. Methods to gather data while conducting market research:

- (a) **Surveys:** Questionnaires distributed to participants.
- (b) **Interviews:** Direct conversations to collect insights.
- (c) **Focus Groups:** Group discussions for qualitative data.

These methods provide comprehensive data for analysis.

14. Data interpretation converts raw data into meaningful insights, enabling informed decision-making, identifying patterns and predicting trends. It is crucial in fields like Marketing, Research and Artificial Intelligence for achieving desired outcomes.

15. We can convert data types in Python using type conversion functions.

- (a) `int ()` : Converts to integer.
- (b) `float ()` : Converts to float.
- (c) `str ()` : Converts to string.

16. Confusion matrix for the given data is as follows:

Actual/Predicted	Predicted Positive	Predicted Negative
Actual Positive	350	50
Actual Negative	30	150

17. Data visualization simplifies complex data, making it easier to understand through graphs, charts and infographics. It highlights patterns, trends and outliers, enabling better decision-making.

In AI, visualization aids in interpreting model performance, comparing datasets and presenting findings effectively. For instance, confusion matrices or heatmaps provide insights into classification models while scatter plots show relationships between variables. By transforming raw data into meaningful visuals, data visualization bridges the gap between technical analysis and audience understanding.

18. Recurrent Neural Networks (RNNs) process sequential data, using the output of one timestep as input for the next. Training involves backpropagation through time (BPTT), which calculates gradients for all timesteps in a sequence.

Steps to train RNNs are:

- (a) Data is fed sequentially into the network.

(b) Weights are updated by minimizing errors via gradient descent.

(c) The network learns temporal dependencies over time.

For example, training an RNN on text data helps it predict the next word based on previous words, which is crucial for tasks like language modelling and sentiment analysis.

19. The given image represents Interactive Mode of Python. In this mode, Python executes code line by line as it is entered into the Python shell. Example: Typing `print("Hello")` immediately displays the output.

On the other hand, Script mode executes a full program saved as a `.py` file.

The two modes are different in the following ways:

(a) Interactive mode is ideal for quick testing.

(b) Script mode is used for larger, reusable codebases.

Both modes complement each other for effective Python programming.

20. In Python, words recognized as special are called keywords. These are predefined and reserved words like `if`, `for`, `def` and `return`, which have a fixed meaning and cannot be used as variable names or identifiers. They form the core syntax and functionality of Python. On the other hand, custom names created by users are called identifiers, e.g., variable names (`age`, `score`) or function names (`calculate_sum`). Identifiers can be chosen freely by the programmer but must follow naming rules like starting with a letter or underscore and avoiding conflicts with Python keywords.

21. (a) Three major limitations of AI are:

- (i) **Data Dependency:** AI requires large, high-quality datasets. For example, biased data in hiring algorithms may perpetuate discrimination.
- (ii) **Lack of Common Sense:** AI cannot reason beyond programmed logic. For instance, self-driving cars may misinterpret unexpected situations.
- (iii) **High Resource Requirements:** AI demands significant computational power and energy, making it costly and less accessible for smaller businesses.

(b) These limitations affect reliability and effectiveness in critical applications like:

- (i) **Autonomous Vehicles:** Errors in interpreting data can lead to accidents.
- (ii) **Medical Diagnostics:** Inaccurate predictions may misdiagnose or overlook critical health issues, endangering lives.