PRACTICE PAPER 4
CLASS IX
ARTIFICIAL INTELLIGENCE (CODE 417)
(SOLUTIONS)

1. (i) Time Management
(ii) (c) Hover
(iii) (a) Both A and R are true and R is the correct explanation for A.
(iv) (d) Read-Only Memory
(v) (d) Telephone calls
(vi) (d) Lithosphere

2. (i) (c) A is true but R is false.
(ii) (b) `Fail`
(iii) (a) Both Statement 1 and Statement 2 are correct.
(iv) (d) 
(v) (d) True
(vi) (b) By analyzing strengths and weaknesses to customize practice problems

3. (i) (c) Secondary
(ii) (b) 0.5
(iii) (d) Reducing the need for critical thinking skills
(iv) (c) Discovering patterns in the data
(v) (c) Interactive Mode
(vi) (d) @hello_python

4. (i) (c) 1
(ii) (d) Statement 2 is correct but Statement 1 is incorrect.
(iii) (a) Machine Learning
(iv) (c) Embedded Systems Programming
(v) (c) 3/6
(vi) (b) Generative Adversarial Networks (GANs)

5. (i) (a) To protect individuals' privacy rights and prevent data misuse
(ii) Probability
(iii) (a) Data Augmentation
(iv) (b) Wisdom
(v) (d) Using strong passwords and encrypting data
(vi) (c) `int("123")`

6. Self-confidence can be built by:
(a) Setting achievable goals and working consistently towards them.
(b) Practising positive self-talk to overcome self-doubt.
(c) Learning from mistakes and celebrating small successes.

7. Essential elements of a communication cycle are as follows:
(a) **Sender:** The person delivering the message.
(b) **Message:** The information being conveyed.
(c) **Channel:** The medium used for communication, *e.g.*, email.
(d) **Receiver:** The person receiving the message.
(e) **Feedback:** The response from the receiver.

8. Some key characteristics of entrepreneurship include:

   (a) **Risk-Taking:** Willingness to take calculated risks for success.

   (b) **Innovation:** Ability to develop creative solutions and new ideas.

   (c) **Leadership Qualities:** Entrepreneurship is all about managing teams with the intent to earn good profits.

9. CPU (Central Processing Unit) is the brain of the computer. Its parts include:

   (a) **ALU (Arithmetic Logic Unit):** Performs calculations and logical operations.

   (b) **Control Unit (CU):** Directs data flow between components.

   (c) **Memory Unit:** Stores data temporarily for processing.

10. Factors that cause ecological imbalance are:

    (a) **Deforestation:** Leads to loss of biodiversity and climate change.

    (b) **Pollution:** Affects air, water and soil quality.

    (c) **Urbanization:** Reduces natural habitats, increasing human-wildlife conflicts.

11. Weak AI (Narrow AI) is designed for specific tasks like speech recognition or image classification, *e.g.*, Siri or facial recognition.

    Strong AI (General AI) possesses human-like intelligence and can perform any cognitive task, *e.g.*, hypothetical fully autonomous robots.

12. Data refers to raw, unprocessed facts or figures. For example, in the project, data can be a list of email addresses or timestamps of when emails were sent.

    Information is data that has been processed or analyzed to have meaning. For example, analyzing the data of email timestamps might reveal patterns such as peak email traffic times.

    Thus, data is the foundation and information is what you get after processing the data to uncover valuable insights.

13. Logical operators in Python are as follows:

    (a) **and:** Returns True if both conditions are True.

    (b) **or:** Returns True if at least one condition is True.

    (c) **not:** Reverses the condition's truth value.

14. In Python, single-line comments start with #.

    Example:
    ```
    # This is a comment
    print("Hello, World!")
    ```

15. Statistics aids disaster management by predicting risks, optimizing resource allocation and improving response times. Data analysis helps in monitoring disaster impacts, evaluating relief efforts and adjusting strategies, ultimately enhancing the efficiency and effectiveness of disaster preparedness and recovery.

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

Actual/Predicted	Predicted Positive	Predicted Negative
Actual Positive	50	5
Actual Negative	10	30

17. Evaluating the AI model in a healthcare project is crucial to ensuring its reliability, accuracy and effectiveness before real-world implementation. Accurate predictions are essential for patient safety and timely interventions.

    Some common methods of evaluation include:

    (a) **Train-Test Split:** Divides the data into training and testing sets to assess the model's performance on unseen data.

    (b) **Cross-Validation:** Divides the data into multiple subsets, training and testing the model on different folds to ensure robustness and reduce overfitting.

    (c) **Confusion Matrix:** Provides a summary of true positives, true negatives, false positives and false negatives, helping assess the model's performance in more detail.

18. The difference between Implicit Type Conversion and Explicit Type Conversion lies in how the conversion is performed and controlled.

(a) **Implicit Type Conversion (Automatic Conversion):**

- Performed automatically by the compiler or interpreter.
- Happens when data is converted from one type to another without the programmer's intervention.
- Example: Converting an integer to a float during arithmetic operations (*e.g.*, `int x = 5; float y = x + 2.5;`).

(b) **Explicit Type Conversion (Manual Conversion):**

- Performed manually by the programmer using casting or conversion functions.
- Allows precise control over the conversion process.
- Example: Casting a float to an integer using `(int)` or `int()` (*e.g.*, `float x = 5.7; int y = (int)x;`).

19. Generative AI refers to Artificial Intelligence that creates new content, such as text, images, audio or code, by learning patterns from existing data. It uses machine learning models like Generative Adversarial Networks (GANs).

Types of Generative AI are:

(i) **Text Generation:** Produces human-like text, *e.g.*, ChatGPT.
(ii) **Image Generation:** Creates visuals from textual descriptions, *e.g.*, DALL-E.
(iii) **Audio Generation:** Synthesizes speech or music, *e.g.*, MusicLM.
(iv) **Code Generation:** Writes code based on input, *e.g.*, Copilot.

The functionalities of the tools shown in the given images are as follows:

(a) **ChatGPT:** A chatbot that generates human-like text, answering questions and engaging in conversation.

(b) **Kidgeni:** Produces creative, kid-friendly content like stories and activities using AI.

20. Types of AI that can be used to make a smart home system are as follows:

(a) **Artificial Narrow Intelligence (ANI):** ANI specializes in specific tasks like controlling lights or adjusting thermostats. It excels within its domain but cannot generalize its knowledge. Example: A smart thermostat learning user preferences.

(b) **Artificial General Intelligence (AGI):** AGI, though hypothetical, would handle diverse tasks such as **managing** energy, identifying security threats and adapting to new smart home needs seamlessly.

(c) **Artificial Superintelligence (ASI):** ASI, a future concept, would surpass human intelligence, autonomously enhancing smart home systems with exceptional problem-solving, creativity and efficiency improvements without human intervention.

21.

Actual/Predicted	Predicted Positive (Spam)	Predicted Negative (Not Spam)
Actual Positive (Spam)	50	10
Actual Negative (Not Spam)	5	100

(i) True Positive (TP): It represents cases that are correctly predicted as positive. In this matrix, 50 emails one correctly identified as 'Spam'.

(ii) False Positive (FP) represents cases that are incorrectly predicted as positive. Here, 5 emails one wrongly classified as *i.e.*, 'Spam'.

(iii) False Negative (FN) represents cases that are incorrectly predicted as negative. In this case, 10 spam emails one missed and classified as 'Not Spam'.

(iv) Using True Positives and False Positives, we can calculate Precision, which measures the accuracy of positive predictions.