PRACTICE PAPER 1
CLASS IX
ARTIFICIAL INTELLIGENCE (CODE 417)
(SOLUTIONS)

1. (i) Time Management
(ii) (c) Random-Access Memory
(iii) (a) Both A and R are true and R is the correct explanation for A.
(iv) (a) Encoding
(v) (c) Reducing stress and improving performance
(vi) (d) Nuclear energy

2. (i) (a) Both A and R are true and R is the correct explanation for A.
(ii) (d) Speech Recognition
(iii) (a) Both Statement 1 and Statement 2 are correct.
(iv) Semi-Structured Data
(v) (c) Predicting stock market trends
(vi) (b) _my_variable

3. (i) (b) Exploratory Data Analysis
(ii) (a) input()
(iii) (d) Decision Trees
(iv) (b) The process of collecting raw data from various sources
(v) (b) 4, 6, 8, 10
(vi) (b) fruits[2]

4. (i) Yes, AI can be used to generate realistic human faces, *e.g.*, GANs.
(ii) (c) Statement 1 is correct but Statement 2 is incorrect.
(iii) (c) Certain
(iv) (a) *for*
(v) (b) Natural Language Processing
(vi) Data acquisition is not the last stage of an AI project cycle as the steps of AI project cycle are:
- Problem Scoping
- Data Acquisition
- Data Exploration
- Modelling
- Evaluation
- Deployment

5. (i) (a) Natural Language Processing
(ii) (c) *do-while* loop
(iii) (b) 15
(iv) (a) Generative AI
(v) (a) Wisdom
(vi) (b) It has authentic creativity.

6. Stress is divided into:
(a) **Eustress (Positive Stress):** A positive form of stress that motivates and improves productivity, *e.g.*, meeting deadlines.
(b) **Distress (Negative Stress):** A negative form of stress that causes anxiety or physical harm, *e.g.*, exam pressure.

7. Some applications of the internet are as follows:
   (a) **Communication:** Enables instant messaging, emails and video calls across the globe.
   (b) **Education:** Facilitates online courses, virtual classrooms and e-learning platforms.
   (c) **E-commerce:** Simplifies online shopping, digital payments and product deliveries.
8. An entrepreneur is someone who identifies opportunities and establishes a business by taking risks. They innovate and manage resources to achieve success while generating employment and contributing to economic growth.
9. Following are some early forms of communication:
   (a) **Drumming:** Used to send warnings or messages over long distances.
   (b) **Flags:** Conveyed signals in maritime and military contexts.
   (c) **Fire:** Send warnings or requests through patterns of lit fires.
   (d) **Horns and Whistles:** Used to signal hunters or convey messages in rural areas.
10. The 4Rs of sustainability are:
   (a) **Refuse:** This signifies that we must refuse to use products that may harm the environment.
   (b) **Reduce:** This means to use environmental resources in a sustainable way and prevent wastage.
   (c) **Reuse:** This means reusing products to promote sustainability.
   (d) **Recycle:** This implies that once a product is reused, it should be recycled so that the leftover resource is properly used again.
11. Using data from reliable sources ensures accuracy and validity in AI models, leading to trustworthy results. Unreliable sources like social media posts, can cause biases and inconsistencies, harming project outcomes. Verified data minimizes errors and enhances credibility.
12.

Aspect	Certain Event	Likely Event
Definition	Absolute and predictable events that are guaranteed to happen	Events that have a probability of occurring or depend on chance/external circumstances but are not guaranteed
Probability	Probability = 1 (100% chance)	Probability lies between 0 and 1
Occurrence	Always occurs in the given conditions	Might occur depending on other factors
Examples	• The sun rising tomorrow • Seasons changing	• Winning a lottery • Chances of rain tomorrow

13. Advantages of Generative AI are as follows:
   (a) **Automation of Creative Tasks:** It generates original content such as images, music and text.
   (b) **Enhanced Productivity:** Reduces manual effort in creative processes.
14.

Aspect	Statement	Expression
Purpose	Executes an action, *e.g.*, loops or decisions	Evaluates a value or result
Role	Controls the program flow or logic	Computes or returns a value
Execution	Does not return a value	Always returns a value
Examples	`if x > 0:, for in range(5):`	`2 + 3, x = y * 2`

15. 4Ws Problem Canvas helps in clearly defining the problem and aligning efforts towards a solution. It systematically scopes a problem.
   (a) **Who:** Identifies stakeholders affected by the problem, *e.g.*, users or customers.
   (b) **What:** Describes the problem or need to be solved.
   (c) **Where:** Specifies the context or location of the problem, *e.g.*, industry or environment.
   (d) **Why:** Explains the importance and potential benefits of solving the problem.

16. Confusion Matrix represents the relationship between actual and predicted outcomes, highlighting true and false classifications for both positive and negative cases.

	Predicted Positive	**Predicted Negative**
Actual Positive	100	40
Actual Negative	20	60

17.

Aspect	**Rule-based AI**	**Learning-based AI**
Definition	Uses predefined logical rules for operations	Learns patterns and adapts from data
Approach	Relies on human-defined logic, *e.g.*, 'if-then-else	Uses algorithms to improve performance
Flexibility	Limited to static rules, *e.g.*, cannot handle changes	Adapts to new data and environments
Applications	• Medical diagnostics • Fraud detection	• Image recognition • Predictive analytics
Example	Expert systems for troubleshooting	Facial recognition systems

18. AI projects rely on diverse data sources for effective model training:

(a) **Public Databases and Repositories:** Open datasets like Kaggle or government portals offer structured data.

(b) **APIs:** Real-time data streams, *e.g.*, Google Maps API.

(c) **Web Scraping:** Extracts unstructured data from websites like reviews or news.

(d) **Sensors:** IoT devices provide real-time environmental data.

(e) **Cameras:** Capture images/videos for computer vision tasks.

(f) **Surveys:** Collect user feedback directly.

These sources ensure varied and credible datasets for AI model development.

19. The images represent the following applications of Generative AI:

1. **Music Generation:** AI help with original music compositions, producing melodies and harmonies for entertainment.
2. **Image Generation:** AI generates realistic visuals such as human faces, artworks or other creative designs.
3. **ChatGPT:** AI powers text-based communication, enabling natural and meaningful conversations.

These examples highlight how AI automates creativity in music, visual arts and text, transforming industries like entertainment, marketing and communication through innovative and efficient solutions.

20. (i) **Output:** `python3`

(ii) **Error:** Strings and integers cannot be concatenated directly, resulting in `TypeError`.

(iii) **Output:**
```
0
2
4
6
8
10
12
14
16
18
```

(iv) **Output:** 3

21. A confusion matrix evaluates the performance of a classification model by comparing actual and predicted results. It consists of four components:

(a) **True Positive (TP):** Correctly predicted positive cases
(b) **True Negative (TN):** Correctly predicted negative cases
(c) **False Positive (FP):** Incorrectly predicted positive cases
(d) **False Negative (FN):** Incorrectly predicted negative cases

It is used to calculate metrics like accuracy, precision and recall to understand model reliability.

In the given confusion matrix:

- **True Positive (TP):** 50
- **True Negative (TN):** 35
- **False Positive (FP):** 5
- **False Negative (FN):** 10