

**PRACTICE PAPER-4**  
**CLASS XII**  
**ARTIFICIAL INTELLIGENCE**

**Time: 2 Hours**

**Maximum Marks: 50**

**General Instructions:**

1. Please read the instructions carefully.
2. This Question Paper consists of **21 questions** in two sections: **Section A & 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) Marks allotted are mentioned against each question/part.
  - (c) There is no negative marking.
  - (d) Do as per the instructions given.
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.

**SECTION A—OBJECTIVE TYPE QUESTIONS**

**1. Answer any 4 out of the given 6 questions on Employability Skills.**

**4 x 1 = 4**

- (i) During a group discussion, Arun is explaining his perspective on a project idea, using some technical terms that Reena doesn't fully understand. Reena listens attentively but is unsure if Arun is proposing a new project or a change in the existing one. [1]

If Meena wanted to follow the 'C' of **RESPECT**, what should she do?

- (a) Stay silent and try to figure it out on her own later to avoid interrupting the flow.
  - (b) Immediately start talking about her own idea as soon as Arun takes a break.
  - (c) Wait for a pause and ask a summarizing question, such as, "Just to clarify, Arun, are you suggesting we start a new, separate project, or are these changes you want to apply to the current project?"
  - (d) Form a judgment that Arun's idea is too confusing and mentally check out of the conversation.
- (ii) In the SMART approach, the letter 'M' stands for \_\_\_\_\_. [1]
- (iii) Match the following personality traits with their correct descriptions. [1]

Skills	Description
1. Self-acceptance	(a) To stay fully present and aware of one's thoughts, feelings and surroundings
2. Mindfulness	(b) To handle pressure calmly by using techniques that reduce physical and mental tension
3. Stress management	(c) To avoid harsh self-criticism and cultivate a mindset of non-judgment

- (a) 1-c, 2-b, 3-a
- (b) 1-b, 2-a, 3-c
- (c) 1-a, 2-b, 3-c
- (d) 1-c, 2-a, 3-b

- (iv) What happens when you apply a transition to a slide? [1]
- A special visual effect is added when moving to the next slide.
  - The slide layout automatically changes.
  - All text on the slide gets converted into bullet points.
  - A new theme is applied to the entire presentation.
- (v) **Assertion (A):** Social entrepreneurs aim to create solutions that benefit society while ensuring long-term sustainability. [1]
- Reason (R):** Social entrepreneurs focus only on earning maximum profit from their ventures.
- Both A and R are correct and R is the correct explanation of A.
  - Both A and R are correct but R is not the correct explanation of A.
  - A is correct but R is incorrect.
  - A is incorrect but R is correct.
- (vi) Waste exchange programs exemplify a circular economy model by ensuring that the byproduct of one industry serves as a raw material for another. (State whether this is True or False). [1]

**2. Answer any 5 out of the given 6 questions.**

**5 x 1 = 5**

- (i) Match the correct questions from Column A to the correct step of the Data Science Methodology in Column B. [1]

Column A	Column B
1. How do we check the performance of the model on unseen data?	(a) Documentation
2. How do we ensure continuous improvement and refinement of the product throughout its different phases?	(b) Problem Understanding
3. How do we ensure project transparency and reproducibility?	(c) Model Validation
4. What is the problem that we are trying to solve?	(d) Analytic approach

- 1-d, 2-b, 3-a 4-c
- 1-c, 2-d, 3-a 4-b
- 1-a, 2-b, 3-d 4-c
- 1-d, 2-c, 3-a 4-b

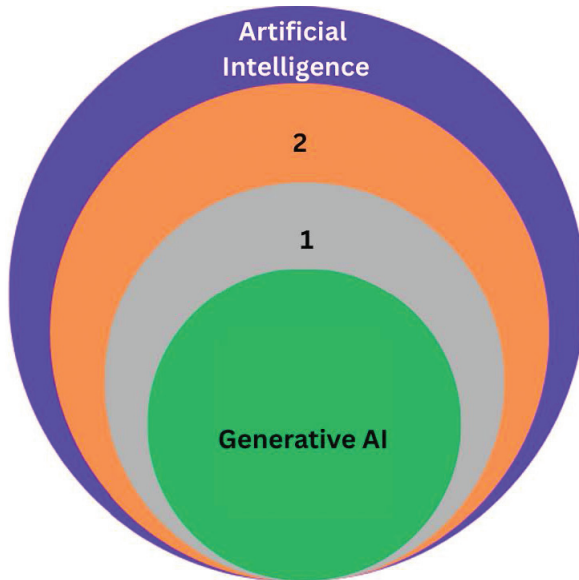
(ii)



The given image shows the working of a vision-based system that identifies a bike. What is the other name of this technology? [1]

- (iii) Which technology reduces dependency on central servers, cuts latency and improves privacy? [1]
- Cloud Computing
  - Parallel Processing
  - Edge Processing
  - Quantum Computing
- (iv) An RNN network is specialized for \_\_\_\_\_, where each input depends on previous inputs. [1]

(v)



What will come in place of '1' and '2'?

[1]

(vi) In the structure of a data story using Freytag's Pyramid, which stage involves introducing the topic and explaining the problem you are trying to solve? [1]

- (a) Climax (b) Exposition (c) Rising Action (d) Resolution

3. Answer any 5 out of the given 6 questions.

5 x 1 = 5

(i) \_\_\_\_\_ is the process of implementing a model in a production environment. [1]

(ii)

### Design Thinking



[1]

What will come in place of '1' and '2'?

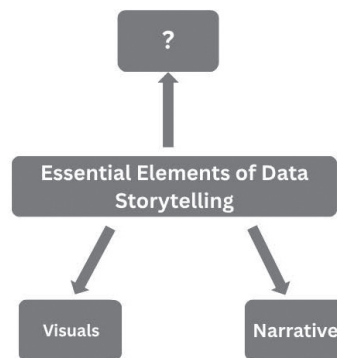
- (a) Empathize, Refine (b) Ideate, Create  
(c) Empathize, Prototype (d) Think, Work

(iii) Match the computer vision technique in Column A with its suitable scenario in Column B. [1]

Column A	Column B
1. Object Detection	(a) A student wants to develop a virtual clothes try-on app.
2. Image Classification	(b) A student wants to mark different objects along with their bounding box in an image.
3. Semantic Segmentation	(c) A smart car wants to navigate in city traffic.
4. Instance Segmentation	(d) A student wants a computer to differentiate between a cat and a dog image.

- (a) 1-d, 2-b, 3-a 4-c  
(b) 1-d, 2-c, 3-b 4-a  
(c) 1-a, 2-b, 3-d 4-c  
(d) 1-b, 2-d, 3-a 4-c

- (iv) Big Data refers to massive and complex datasets generated from various digital sources. Which of the following is **NOT** an example of Big Data? [1]
- (a) Social media user post (b) IOT devices, logs and sensor data  
(c) Excel sheet for students' marks (d) IRCT transaction records
- (v) Identify the **odd one out** from the following layers of the neural network. [1]
- (a) Input layer (b) Output layer  
(c) Hidden layer (d) ReLU
- (vi) Refer to the Venn diagram that illustrates the three key elements. It includes Visuals and Narrative as two elements. What term should replace the question mark (?) to complete the diagram? [1]

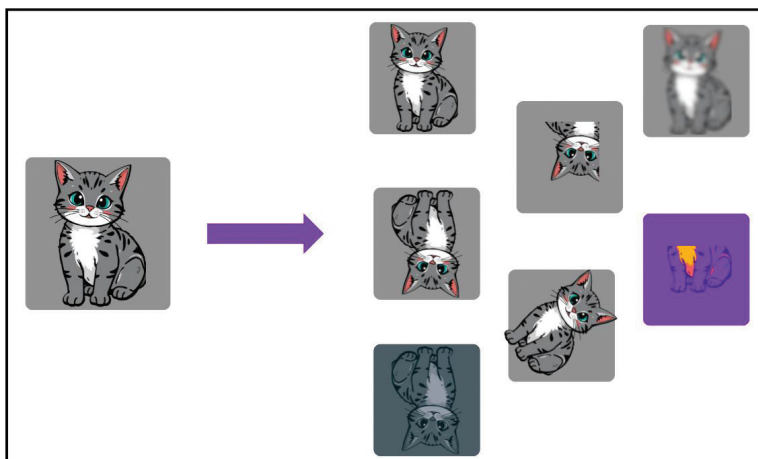


**4. Answer any 5 out of the given 6 questions.**

**5 x 1 = 5**

- (i) **Assertion (A):** The Data Preparation phase is essential because high-quality input data leads to more accurate and reliable model outcomes. [1]
- Reason (R):** During this phase, techniques such as handling missing values, removing duplicates and normalizing data are applied to improve data quality.
- (a) Both A and R are correct and R is the correct explanation of A.  
(b) Both A and R are correct but R is not the correct explanation of A.  
(c) A is correct but R is incorrect.  
(d) A is incorrect but R is correct.

- (ii) [1]



When training an AI image-recognition model, multiple altered versions of the same picture (such as rotated, flipped, zoomed or colour-shifted image) are created to improve the model's learning. This process is known as \_\_\_\_\_.

- (iii) Which technology in Big Data Analytics allows extremely fast processing of large datasets by using in-memory computation? [1]
- (a) Hadoop MapReduce (b) Apache Spark  
(c) Data Warehousing (d) Web Crawling

- (iv) In a neural network, what numerical parameter determines the importance or strength of an input's influence on a neuron? [1]  
 (a) Bias (b) Output (c) Weight (d) Input
- (v) Name the two important stages through which neural networks learn patterns in data. [1]
- (vi) Match the technology in Column A with its correct description in Column B. [1]

Column A	Column B
1. Artificial Intelligence	(a) Uses neural networks to learn complex patterns.
2. Deep Learning	(b) Is used to create new content such as text, images or videos instead of just analyzing data.
3. Generative AI	(c) Enables machines to learn from data rather than being manually programmed.
4. Machine Learning	(d) Refers to machines performing tasks that typically require human intelligence.

- (a) 1-d, 2-a, 3-b 4-c  
 (b) 1-b, 2-c, 3-a 4-d  
 (c) 1-a, 2-b, 3-d 4-c  
 (d) 1-c, 2-d, 3-b 4-a

**5. Answer any 5 out of the given 6 questions.**

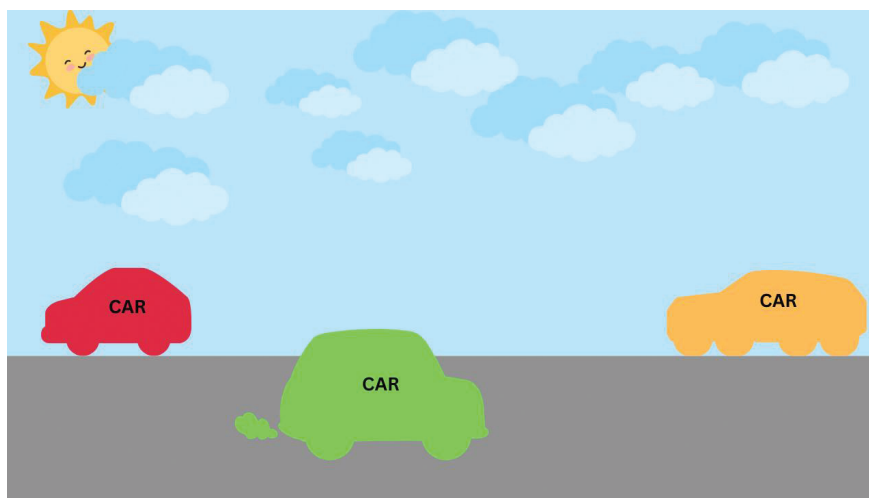
**5 x 1 = 5**

- (i) Root Mean Squared Error (RMSE) is a widely used metric in regression analysis that measures the square root of the average of the squared differences between predicted and actual values. *(State whether this is True or False)* [1]
- (ii) **Assertion (A):** Deploying computer vision models on low-power devices like drones without cloud connectivity is a significant challenge in edge computing. [1]

**Reason (R):** The primary reason for this challenge is the massive carbon footprint generated during the initial training of these complex models.

- (a) Both A and R are correct and R is the correct explanation of A.  
 (b) Both A and R are correct but R is not the correct explanation of A.  
 (c) A is correct but R is incorrect.  
 (d) A is incorrect but R is correct.

(iii)



The image displays clear and well-defined regions of the objects, complete with labels. Which computer vision task does this illustrate? [1]

- (a) Image Classification (b) Object Detection  
 (c) Image Segmentation (d) Instance Segmentation

- (iv) Match the type of neural network in Column A with its corresponding task in Column B. [1]

Column A	Column B
1. Recurrent Neural Network	(a) Weather forecast
2. Feed Forward Neural Network	(b) Image generation
3. Generative Adversarial Network	(c) Weight prediction

- (a) 1-c, 2-b, 3-a  
(b) 1-b, 2-a, 3-c  
(c) 1-a, 2-c, 3-b  
(d) 1-b, 2-c, 3-a
- (v) \_\_\_\_\_ models are a class of models in machine learning that focus on distinguishing between different classes. [1]
- (vi) Which chart type would be most appropriate to visualize the relationship between a company's advertising expenditure and its sales revenue across multiple months? [1]
- (a) Pie Chart (b) Scatter Plot  
(c) Line Chart (d) Flowchart

### SECTION B—SUBJECTIVE TYPE QUESTIONS

Answer any 3 out of the given 5 questions on Employability Skills.

3 x 2 = 6

Answer each question in 20–30 words.

6. 'In', 'To', 'On', 'With'

In the context of English grammar, what are these words known as? Explain. [2]

7. State any two ways in which a person can develop or strengthen extrinsic motivation. [2]

8. In LibreOffice Impress, you can align text inside a text box or shape to the left, right, centre, top, middle or bottom. [2]

- (a) Name this feature of LibreOffice Impress.  
(b) How is the text aligned by default inside a text box?

9. Identify the qualities demonstrated by the following entrepreneurs: [2]

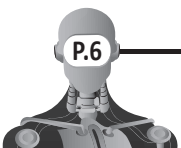
- (a) Peyush Bansal, founder of Lenskart, began his journey by identifying the difficulties people faced in accessing affordable and high-quality eyewear. Starting with an online platform, he focused on solving this problem through technology, quick delivery and a wide range of choices. Even when the company faced challenges in building trust, managing logistics and expanding stores across India, he continued to prioritize customer satisfaction and innovation in the eyewear industry.
- (b) Falguni Nayar, founder of Nykaa, left a successful 25-year-long corporate career in investment banking to start an online beauty and wellness platform at the age of 50. She took calculated risks, learned the digital business from scratch and worked tirelessly to build Nykaa, which is now one of India's most successful e-commerce companies.

10. What are green jobs? How do green jobs in transportation help in reducing greenhouse gas emissions? [2]

Answer any 4 out of the given 6 questions in 20–30 words each.

4 x 2 = 8

11. Define Data Preparation. List any two ways by which data is prepared for analysis and modelling. [2]
12. Computer vision, a vital part of artificial intelligence, often relies on extracting meaningful patterns from images to understand the visual world. Explain any two challenges faced during feature extraction. [2]
13. Differentiate between Traditional Computing and Edge Computing. [2]



14. Consider the following perceptron that predicts the academic performance with inputs, weights and a bias of 3. Calculate Output/Predicted outcome ( $\hat{y}$ ) for the given scenario. [2]

Factor	Input	Weight
Study Hours	1	8
Video Games Played	0	-4
Meditation	1	2

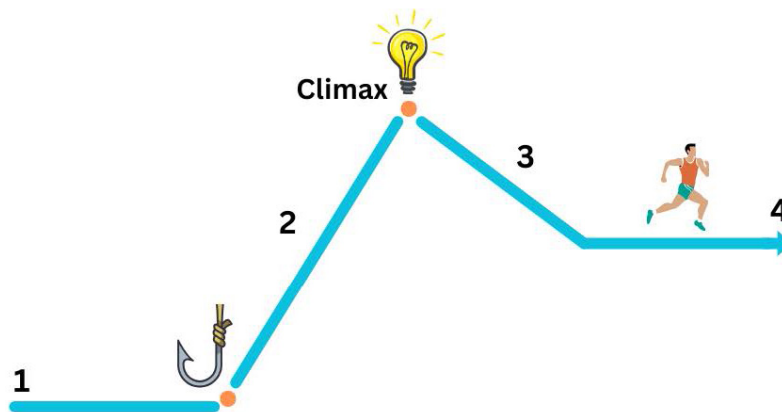
15. What distinguishes generative models from traditional machine learning models? [2]  
 16. List the features that are essential to make an engaging data story. [2]

Answer any 3 out of the given 5 questions in 50–80 words each.

3 x 4 = 12

17. A Confusion Matrix is used to evaluate the performance of a classification model. Draw and label a standard 2x2 Confusion Matrix and write the formulas for Precision and Recall. Briefly explain the trade-off between them. [4]
18. A major online gaming company analyzes player data to improve gameplay experience, engagement and system performance. Identify the type of analytics being used in each scenario below and explain them in detail: [4]
- The company reviews past player activity—such as total playtime, most-used characters, and win/loss statistics—to understand overall gaming behaviour.
  - Analysts investigate why a sudden drop in player engagement happened after a new update by examining game logs, feedback and error reports.
  - The system forecasts which players are most likely to stop playing the game soon, based on their recent activity patterns and gameplay history.
  - Based on a player's skill level, preferred play style and past matches, the game suggests optimized difficulty settings and personalized in-game recommendations to improve their experience.
19. Explain how neural networks learn from their mistakes using the process of backpropagation. Describe the role of errors and weights in this learning mechanism. [4]
20. Explain the structural flow of the Variational Autoencoder (VAE) with a neat diagram. [4]

21.



The image illustrates Freytag's Pyramid, a classic narrative structure.

Climax is the most important part of the story. Identify and briefly explain the stages labelled as '1', '2', '3' and '4' in the diagram.