

**Artificial Intelligence (843)**  
**Class XII (Session 2025-2026)**  
**Sample Question Paper – 2**

**Max. Time: 2 Hours**

**Max. Marks: 50**

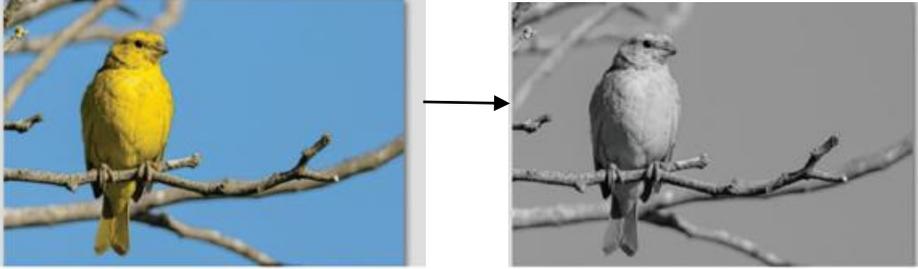
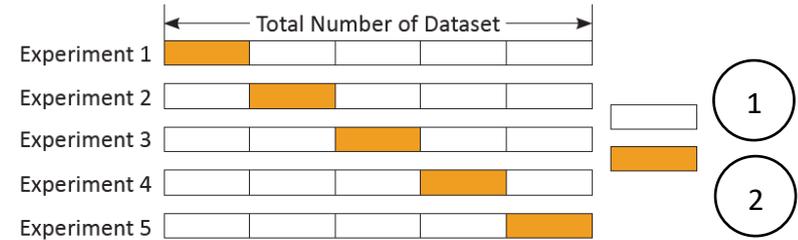
**General Instructions:**

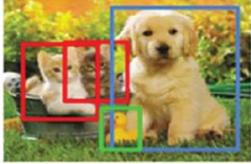
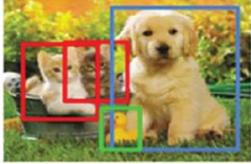
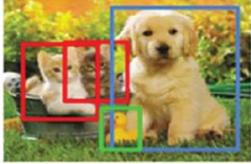
1. Please read the instructions carefully.
2. This Question Paper consists of 21 questions in two sections: Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. Out of the given (5 + 16 =) 21 questions, a candidate has to answer (5 + 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):**
  - i. This section has 05 questions.
  - ii. Marks allotted are mentioned against each question/part.
  - iii. There is no negative marking.
  - iv. Do as per the instructions given.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):**
  - i. This section has 16 questions.
  - ii. A candidate has to do 10 questions.
  - iii. Do as per the instructions given.
  - iv. Marks allotted are mentioned against each question/part.

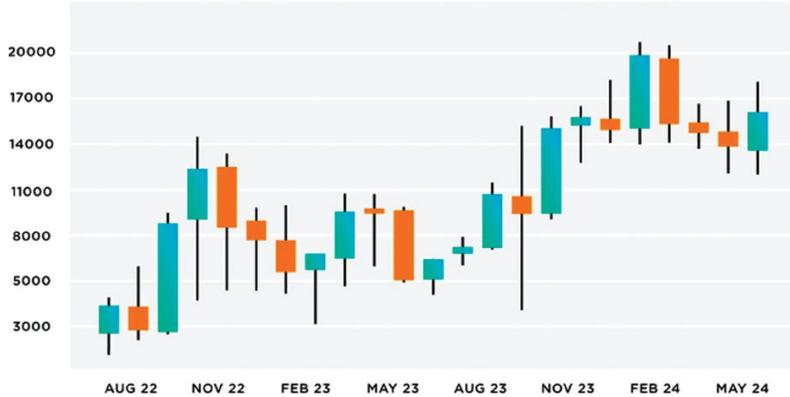
**Section A: Objective Type Questions**

<b>Q1.</b>	<b>Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)</b>			
i.	During a cooking activity, Dia accidentally knocks over a bowl of flour. A white cloud rises into the air, covering her hair and uniform. She jumps back and shouts, <i>Aah!</i> Not again! The whole class bursts into laughter. What part of speech is the word <i>Aah</i> ? a. Interjection b. Conjunction c. Adverb d. Preposition	1		
ii.	_____ is about understanding one’s own needs, desires, habits, traits, behaviours and feelings.	1		
iii.	Match the personality disorder with its correct description. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">1. Paranoid Personality Disorder</td> <td style="width: 50%;">a. Disregards social rules, acts impulsively, aggressive</td> </tr> </table>	1. Paranoid Personality Disorder	a. Disregards social rules, acts impulsively, aggressive	1
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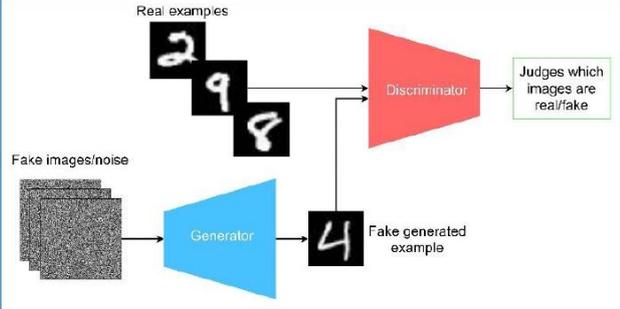
	<p>2. Schizoid Personality Disorder</p> <p>3. Antisocial Personality Disorder</p> <p>4. Obsessive-Compulsive Personality</p> <p>b. Distrustful of others, holds grudges</p> <p>c. Strongly sticks to rules, perfectionist, may neglect relationships</p> <p>d. Detached, aloof, focused on inner life, little interest in relationships</p> <p>a. 1 → a, 2 → b, 3 → c, 4 → d</p> <p>b. 1 → b, 2 → c, 3 → d, 4 → a</p> <p>c. 1 → c, 2 → d, 3 → a, 4 → b</p> <p>d. 1 → b, 2 → d, 3 → a, 4 → c</p>	
iv.	<p>Aarav is creating a presentation about plants. He wants the headings on his slides to appear in green so that they stand out. Which option should Aarav use to change the colour of the text?</p> <p>a. Font Color</p> <p>b. Highlight Color</p> <p>c. Font</p> <p>d. Format</p>	1
v.	<p><b>Assertion (A):</b> Entrepreneurs take risks to start and manage new businesses.</p> <p><b>Reason (R):</b> Entrepreneurship involves identifying opportunities, planning, and organising resources to achieve business goals.</p> <p>a. Both A and R are true, and R explains A.</p> <p>b. Both A and R are true, but R does not explain A.</p> <p>c. A is true, but R is false.</p> <p>d. A is false, but R is true.</p>	1
vi.	<p>Green jobs in solid waste management focus only on paperwork and do not involve activities like waste collection, recycling, or composting. (State whether this is True/False)</p>	1
<b>Q2.</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>	
i.	<p>The foundation methodology of Data Science consists of 10 steps. Which option shows the correct order of the five module-pairs used to solve an AI project from beginning to end?</p> <p>a. Problem to Approach → Requirements to Collection → Understanding to Preparation → Modelling to Evaluation → Deployment to Feedback</p> <p>b. Modelling to Evaluation → Deployment to Feedback → Problem to Approach → Understanding to Preparation → Requirements to Collection</p> <p>c. Requirements to Collection → Problem to Approach → Deployment to Feedback → Modelling to Evaluation → Understanding to Preparation</p> <p>d. Deployment to Feedback → Modelling to Evaluation → Understanding to Preparation → Requirements to Collection → Problem to Approach</p>	1

ii.	<p>Look at the picture. The colourful image has been converted into one that shows different tones instead of colours. This converted picture is called a _____ image.</p> 	1
iii.	<p>Which Big Data characteristic focuses on the accuracy, consistency, and trustworthiness of data?</p> <p>a. Volume b. Velocity c. Variety d. Veracity</p>	1
iv.	<p>In neural networks, the _____ decides whether a neuron should be activated (send a signal) or not based on its input.</p>	1
v.	<p>Which of the following statements is true about GANs and VAEs?</p> <p>a. GANs use an encoder and decoder to map data into a latent space. b. VAEs involve a generator and a discriminator competing against each other. c. GANs generate realistic images by having a generator and discriminator compete. d. VAEs cannot be used for anomaly detection.</p>	1
vi.	<p>In data storytelling, which framework helps structure the presentation of data and insights to engage the audience and guide them through a narrative journey?</p> <p>a. Freytag's Pyramid b. SWOT Analysis c. Gantt Chart d. Pareto Principle</p>	1
<b>Q3.</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>	
i.	<p>In model evaluation, if the model is a predictive model, a _____ can be used to evaluate the output of the model.</p>	1
ii.	 <p>In K-Fold Cross Validation, what will come in place of 1 and 2?</p>	1

	<p>a. 1 → Validation, 2 → Training  b. 1 → Training, 2 → Validation  c. 1 → Test, 2 → Training  d. 1 → Test, 2 → Validation</p>									
iii.	<p>The four images below represent different object detection tasks. Match each image with the correct task from Column B.</p> <table border="1"> <tr> <td>   i. \ CAT, DOG, DUCK </td> <td>a. Instance Segmentation</td> </tr> <tr> <td>   ii. \ CAT </td> <td>b. Classification + Localisation</td> </tr> <tr> <td>   iii. CAT, DOG, DUCK , </td> <td>c. Object Detection</td> </tr> <tr> <td>   iv. CAT , </td> <td>d. Classification</td> </tr> </table> <p>a. i. → b, ii. → c, iii. → a, iv. → d  b. i. → a, ii. → b, iii. → c, iv. → d  c. i. → c, ii. → d, iii. → a, iv. → b  d. i. → d, ii. → a, iii. → b, iv. → c</p>	 i. \ CAT, DOG, DUCK	a. Instance Segmentation	 ii. \ CAT	b. Classification + Localisation	 iii. CAT, DOG, DUCK ,	c. Object Detection	 iv. CAT ,	d. Classification	1
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 iv. CAT ,	d. Classification									
iv.	<p>Which technology allows organizations to access hardware and software resources remotely via the Internet on a pay-as-you-go basis, eliminating the need for extensive on-premises infrastructure?</p> <p>a. Cloud Computing  b. Edge Computing  c. Blockchain  d. Big Data Analytics</p>	1								
v.	<p>Which statement correctly differentiates Forward Propagation and Back Propagation?</p> <p>a. Both compute activations and update weights simultaneously</p>	1								

	<p>b. Forward Propagation updates weights; Back Propagation computes activations</p> <p>c. Forward Propagation computes activations; Back Propagation updates weights</p> <p>d. Both are used only during testing, not training</p>	
vi.	<p>This image shows a chart representing the opening, closing, high, and low prices of a stock over time using vertical bars with wicks. Which type of chart is depicted?</p>  <p>a. Line Chart</p> <p>b. Bar Chart</p> <p>c. Candlestick Chart</p> <p>d. Area Chart</p>	1
<b>Q4.</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>	
i.	<p><b>Assertion (A):</b> Cross Validation is normally applied on small datasets.</p> <p><b>Reason (R):</b> Every data point at some stage could be in either the training or testing dataset.</p> <p>a) Both A and R are true, and R is the correct explanation of A.</p> <p>b) Both A and R are true, but R is not the correct explanation of A.</p> <p>c) A is true, but R is false.</p> <p>d) A is false, but R is true.</p>	1
ii.	<p>_____ identifies the boundaries between different regions in an image where there is a significant change in intensity.</p>	1
iii.	<p>Which type of data processing analyses small batches of data as they arrive, enabling real-time or near real-time decision-making?</p> <p>a. Stream Processing</p> <p>b. Scheduled Processing</p> <p>c. Batch Processing</p> <p>d. Offline Processing</p>	1
iv.	<p>Which process in neural network training involves fine-tuning the weights based on the error obtained in the previous iteration to improve prediction accuracy over time?</p> <p>a. Forward Propagation</p> <p>b. Backpropagation</p> <p>c. Activation</p> <p>d. Data Normalization</p>	1

v.	Which type of neural network, also called a multi-layer perceptron, has data flowing only in one direction from input to output?	1								
vi.	<p>Match the following AI models with their descriptions.</p> <table border="1"> <tr> <td>1. Transformers</td> <td>a. Models that learn the data distribution to generate new samples</td> </tr> <tr> <td>2. Discriminative Models</td> <td>b. Neural network architecture widely used in LLMs to understand complex language patterns in large text data</td> </tr> <tr> <td>3. Generative Models</td> <td>c. Models consisting of an encoder and decoder that learn latent representations to generate data</td> </tr> <tr> <td>4. Variational Autoencoders (VAEs)</td> <td>d. Models that learn class boundaries to distinguish between categories such as spam and non-spam emails</td> </tr> </table> <p>a. 1 → b, 2 → d, 3 → a, 4 → c  b. 1 → a, 2 → b, 3 → d, 4 → c  c. 1 → c, 2 → d, 3 → b, 4 → a  d. 1 → b, 2 → a, 3 → c, 4 → d</p>	1. Transformers	a. Models that learn the data distribution to generate new samples	2. Discriminative Models	b. Neural network architecture widely used in LLMs to understand complex language patterns in large text data	3. Generative Models	c. Models consisting of an encoder and decoder that learn latent representations to generate data	4. Variational Autoencoders (VAEs)	d. Models that learn class boundaries to distinguish between categories such as spam and non-spam emails	1
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<b>Q5.</b>	<b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>									
i.	Deployment refers to the stage where the trained AI model is made available to the users in real-world applications. (State whether this is True/False)	1								
ii.	<p><b>Assertion (A):</b> All pixels in an image are assigned a class in instance segmentation.</p> <p><b>Reason (R):</b> Instance segmentation does not differentiate between individual objects in the same class.</p> <p>a. Both A and R are true, and R is the correct explanation of A  b. Both A and R are true, but R is not the correct explanation of A  c. A is true, but R is false  d. A is false, but R is true</p>	1								
iii.	<p>Match the Feature Extraction technique to its description.</p> <table border="1"> <tr> <td>1. Edge Detection</td> <td>a. Extracts features like smoothness, roughness, or repetition in an image</td> </tr> <tr> <td>2. Corner Detection</td> <td>b. Identifies points where two or more edges meet, often corresponding to corners or junctions</td> </tr> <tr> <td>3. Texture Analysis</td> <td>c. Quantifies colour distributions within an image for discrimination between objects</td> </tr> <tr> <td>4. Colour-based Feature Extraction</td> <td>d. Identifies boundaries between different regions in an image where intensity changes significantly</td> </tr> </table> <p>a. 1 → d, 2 → b, 3 → a, 4 → c</p>	1. Edge Detection	a. Extracts features like smoothness, roughness, or repetition in an image	2. Corner Detection	b. Identifies points where two or more edges meet, often corresponding to corners or junctions	3. Texture Analysis	c. Quantifies colour distributions within an image for discrimination between objects	4. Colour-based Feature Extraction	d. Identifies boundaries between different regions in an image where intensity changes significantly	1
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	<p>b. 1 → b, 2 → d, 3 → c, 4 → a</p> <p>c. 1 → a, 2 → c, 3 → b, 4 → d</p> <p>d. 1 → c, 2 → a, 3 → d, 4 → b</p>	
iv.	<p>This image shows a system with two neural networks – a generator and a discriminator – working together to create and evaluate new data samples. Which type of neural network does this represent?</p>  <p>a. Convolutional Neural Network (CNN)</p> <p>b. Feedforward Neural Network (FFNN)</p> <p>c. Generative Adversarial Network (GAN)</p> <p>d. Recurrent Neural Network (RNN)</p>	1
v.	_____ learns patterns from data and autonomously generates similar samples.	1
vi.	<p>Which type of data visualisation compares data across categories using colour to highlight strong and weak areas?</p> <p>a. Bar Chart</p> <p>b. Pie Chart</p> <p>c. Heat Map</p> <p>d. Line Graph</p>	1
<p><b>Section B: Subjective Type Questions</b></p> <p><b>Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks)</b></p> <p><b>Answer each question in 20 – 30 words.</b></p>		
Q6.	What does E stand for in the RESPECT method in the context of active listening?	2
Q7.	What is stress, and how can it be managed effectively?	2
Q8.	<p>Sana is managing her online store sales in a spreadsheet with columns for Product Name, Quantity Sold, Sale Date, and Revenue. She wants to organise the data to make it easier to analyse.</p> <p>a. Which spreadsheet feature should Sana use to organise products from the highest to lowest revenue?</p> <p>b. Which feature should she use to display only the sales that occurred in November?</p>	2
Q9.	What is start up? Explain any two key characteristics of startups.	2
Q10.	What is an ecosystem, and how do human activities like deforestation and industrialisation disturb its natural balance?	2
<p><b>Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)</b></p>		
Q11.	What are the four main types of data analytics used to solve problems?	2

<b>Q12.</b>	Preprocessing is an important stage in the computer vision process to enhance image quality. Explain any two common techniques used in image preprocessing.	2															
<b>Q13.</b>	List and explain any two global trends that have led to the emergence of Big Data Analytics.	2															
<b>Q14.</b>	<p>A perceptron predicts whether a bank will approve a loan for an applicant. The factors, inputs, weights, and bias are given below. The perceptron uses a threshold value of 2 for activation.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Factor</th> <th>Input (<math>x_i</math>)</th> <th>Weight (<math>w_i</math>)</th> </tr> </thead> <tbody> <tr> <td>Credit Score Good</td> <td>1</td> <td>5</td> </tr> <tr> <td>Stable Job</td> <td>1</td> <td>3</td> </tr> <tr> <td>Existing Loans</td> <td>1</td> <td>-4</td> </tr> <tr> <td>Bias</td> <td>–</td> <td>-1</td> </tr> </tbody> </table> <p>a. Calculate the weighted sum.  b. Determine the predicted outcome (<math>\hat{y}</math>) using the threshold:</p> $\hat{y} = \begin{cases} 1, & \text{if weighted sum} \geq 2 \\ 0, & \text{if weighted sum} < 2 \end{cases}$	Factor	Input ( $x_i$ )	Weight ( $w_i$ )	Credit Score Good	1	5	Stable Job	1	3	Existing Loans	1	-4	Bias	–	-1	2
Factor	Input ( $x_i$ )	Weight ( $w_i$ )															
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Existing Loans	1	-4															
Bias	–	-1															
<b>Q15.</b>	What is the primary use of transformers in Large Language Models (LLMs)?	2															
<b>Q16.</b>	What are the key elements of data storytelling?	2															
<b>Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)</b>																	
<b>Q17.</b>	Explain the importance of Data Preparation and Feature Engineering in building machine learning models. Support your answer with an example showing how new features can be created from raw data to improve model performance.	4															
<b>Q18.</b>	<p>A global healthcare organisation collects patient information, medical records, and research data from multiple sources every day. Identify the types of Big Data in the following scenarios and explain them in detail:</p> <p>a. Patient details, appointments, and billing records are stored in well-defined tables with rows and columns.  b. Lab reports, XML-based health forms, and JSON files from wearable devices contain some organisation but also flexible elements.  c. Medical imaging scans, audio recordings of doctor consultations, emails, and social media posts about health trends are collected in various formats without a fixed structure.  d. The organisation sometimes receives incomplete or inconsistent records, so the data team cleans the data to ensure accuracy and reliability before analysis.</p>	4															
<b>Q19.</b>	Identify and explain the main components of a neural network. For each component, describe its role in processing data and how it contributes to the overall functioning of the network.	4															
<b>Q20.</b>	What are Large Language Models (LLMs)? Explain their key components, how they work, and provide an example of their	4															

	applications. Draw a diagram showing the flow from training data to model output.	
<b>Q21.</b>	Explain the five stages of Freytag's Pyramid used in storytelling. Describe how each stage helps structure a data story, from introducing the context to presenting insights and recommendations. Also draw a labelled diagram of Freytag's Pyramid.	4