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LUCKNOW REGION
ARTIFICIAL INTELLIGENCE (SUBJECT CODE -843)
Examination :Preboard
Class :XII

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

Q. 1	**Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)**	
i.	During a discussion on communication skills, the acronym RESPECT was explained to highlight key behaviors. What does the letter "P" stand for in RESPECT? a) Patience b) Politeness c) Practice empathy d) Publicly praise, prosecute privately	**1**
ii.	Which of the following is an example of intrinsic motivation? a. Studying to get better grades b. Practicing a skill for the pure joy of learning c. Working overtime for monetary benefits d. Competing in a race to win a trophy	**1**
iii.	_ The skill of setting and working towards personal targets and deadlines is known as ____	**1**
iv.	Match the following entrepreneurial terms with their definitions: 1.Risk-taking 2. Innovation 3.Networking A. Building professional relationships B. Introducing new products or ideas C. Taking decisions despite uncertainty a. A - 3; B - 2; C - 1 b. A - 2; B - 3; C - 1 c. A - 1; B - 2; C - 3 d. A - 3; B - 1; C - 2	**1**

v.	1. Which skill helps an entrepreneur to handle uncertainty and change effectively? a) Creativity b) Adaptability c) Leadership d) Networking	**1**
vi	Which of the following best describes appropriate technology? a) Large-scale, resource-intensive, and globally standardized technology b) Small-scale, environmentally friendly technology designed to meet local needs sustainably c) Technology primarily based on advanced robotics and AI automation d) Technology that requires heavy investment and complex maintenance	
Q2	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**	
i	Match the correct question from Column A to the correct step of the Data Science Methodology in Column B.	**1**

Column A	Column B
1. In what way can the data be visualized to get to the required answer?	a. Data Understanding
2. How can you use the data to answer the question?	b. Business Understanding
3. What is the problem that you are trying to solve?	c. Analytic approach
4. Is the data collected representative of the problem to be solved?	d. AI Modelling

a) 1→a, 2→b, 3→c, 4→d
b) 1→c, 2→d, 3→b, 4→a
c) 1→b, 2→c, 3→d, 4→a
d) 1→d, 2→a, 3→b, 4→c

ii	[Image: Bowl of fruits → Sensing device → Interpreting device → Output: Bowl, Orange, Banana, Peach, etc.] The given diagram shows the working of a vision-based system that identifies objects in an image. What is the other name for this technology?	
iii	Match the following 1) Which category? 2) How much or how many? 3) Which group? 4) Is this unusual? 5) Which option should be taken? A. (Anomaly Detection) B. (Regression) C. (Recommendation) D. (Classification) E. (Clustering) a) 1=D, 2=B, 3=E, 4=A, 5=C b) 1=C, 2=D, 3=B, 4=E, 5=A c) 1=D, 2=B, 3=C, 4=E, 5=A d) 1=E, 2=A, 3=D, 4=C, 5=B	**1**

iv	**Which of the following is NOT a typical activation function in ANN?** **a) Sigmoid** **b) ReLU** **c) Tanh** **d) Linear Regression**	**1**
v	**The key feature of a narrative in data storytelling is:** a) Graphics b) Data analysis c) Context d) Visuals	**1**
vi	What is the primary goal of the Empathize phase in the Design Thinking process? a) Gathering insights into user needs and experiences b) Creating a working prototype c) Testing the solution with users d) Defining the problem statement	**1**
Q. 3	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**	
i	Which machine learning algorithm is primarily used for classification tasks? a) K-Means Clustering b) Linear Regression c) Support Vector Machine (SVM) d) Principal Component Analysis (PCA)	**1**
ii	Which of the following best describes a confusion matrix in machine learning? a) A table showing actual vs predicted classification result counts b) A tool for data visualization in clustering c) A measure of regression accuracy d) A method to normalize features before training	**1**
iii	In this phase, we define the project's strategic business objectives and desired outcomes, align all stakeholders' expectations as well as establish success metrics. Identify this phase of the AI Model Life Cycle. (a) Design (b) Scoping (c) Evaluation (d) Data Collection	**1**
iv	**Assertion (A):** Stories that combine statistics and analytics are more persuasive. **Reason (R):** When we talk about data storytelling, we're talking about stories in which data plays a central role. Select the appropriate option for the statements given above: (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true and R is not the correct explanation of A (c) A is true but R is false (d) A is False but R is true	**1**
v	Which of the following is **not** a feature of RMSE? (a) It tells about the accuracy of the model. (b) Higher value means hyper parameters need to be tweaked	**1**

	(c) Lower RMSE values are not good for the AI model. (d) RMSE is a measure of how evenly distributed residual errors are.	
vi	Once you have got an AI model that's ready for production, AI engineers then _____ a trained model, making it available for external inference requests. (a) Evaluate (b) Test (c) Deploy (d) Redesign	1
Q. 4	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**	
i	Assertion (A): Model evaluation is essential to verify if the AI model performs accurately and meets the desired objectives. Reason (R): Evaluation techniques include train-test split and cross-validation, which assess the model's ability to generalize on unseen data. 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.	1
ii	Identify the following icons: 	1
iii	**Which of the following is a limitation of the Cross-Validation technique in AI?** (a) It can give an accurate estimate of how the model will perform on new data. (b) It helps in fine-tuning model parameters more easily. (c) It can be computationally expensive due to repeated training. (d) It makes the model more robust to overfitting.	1
iv	In machine learning, the process of adjusting hyperparameters to improve model performance is called: (a) Model fitting (b) Hyperparameter tuning (c) Feature engineering (d) Gradient descent	1
v	The steps that assist in finding compelling stories in the data sets are as follows. Arrange them in proper order: 1) Visualize the data. 2) Examine data relationships. 3) Get the data and organise it. 4) Create a simple narrative embedded with conflict. (a) 1-2-3-4 (b) 2-3-1-4 (c) 4-1-3-2 (d) 3-1-2-4	1
vi	Choose the difference between Regression and Classification Loss functions from the following: (a) Regression functions predict a quantity, and classification functions predict a label. (b) Regression functions predict a label, and classification functions predict a quantity. (c) Regression functions predict a qualitative value, and classification functions predict a	1

	label. (d) Regression functions predict a label, and classification functions predict a qualitative value.	
Q. 5	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**	
i	Stories change the way that we interact with data, transforming it from a dry collection of_____ to something that can be entertaining, thought provoking, and inspiring change. (a) visuals (b) points (c) images (d) facts	**1**
ii	A good model should have an_____value less than 180. (a) RMSE (b) MSE (c) Focal Loss (d) MAE	**1**
iii	Which of the following is **incorrect**? 1) Testing data is the one on which we train and fit our model basically to fit the parameters 2) Training data is used only to assess performance of model 3) Testing data is the unseen data for which predictions have to be made a) 1) and 3) only b) 1) and 2) only c) 2) and 3) only d) 1), 2) and 3)	**1**
iv	Choose an example of an AI predictive model. (a) YouTube (b) Spam detection (c) weather forecast (d) Sentiment Analysis	**1**
v	Which of the following are the objectives of the testing team in AI modelling? 1) Model Validation 2) Security compliance 3) Understanding data 4) Minimizing bias a. (1), (2) and (3) b. (2), (3) and (4) c. (1), (3) and (4) d. (1), (2) and (4)	**1**
vi	If AI techniques are to be applied to a dataset, the data must have a_____. a. association b. relationship c. pattern d. Either a and b	**1**

SECTION B: SUBJECTIVE TYPE QUESTIONS

Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks) Answer each question in 20 – 30 words.

Q. 6	Mention two ethical concerns related to Generative AI.	**2**
Q. 7	Amit has developed a habit of constantly checking if the doors and windows are locked, even though he has already checked them multiple times. He feels anxious about leaving them unlocked and finds it hard to focus on other tasks. This behavior is affecting his daily routine and interactions with others. Suggest her one way in which she can overcome her personality disorder.	**2**
Q. 8	Differentiate between the terms worksheet and workbook.	**2**
Q. 9	Name two government schemes that help small-scale entrepreneurs gain capital.	**2**
Q. 10	The greening of economy presents a major opportunity to start new businesses, develop new markets and lower energy costs. Write any two benefits of green jobs.	**2**

Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)

Q. 11	Explain 3rd step of capstone project .	**2**

<table>
<tr><td>Q. 12</td><td>Explain any two challenges faced in computer vision while making machines see and interpret images correctly. Provide examples.</td><td>2</td></tr>
<tr><td>Q. 13</td><td>Explain supervised learning and unsupervised learning in brief. Give one real-world example where each technique is applied.</td><td>2</td></tr>
<tr><td>Q. 14</td><td>Given a perceptron with inputs and weights as below, compute the output (ŷ) using the formula: y^=activation(∑(inputi×weighti)+bias)

<table><tr><td>Input feature</td><td>input</td><td>weight</td></tr><tr><td>Hours studied</td><td>2</td><td>4</td></tr><tr><td>Hours slept</td><td>1</td><td>3</td></tr><tr><td>Distractions (hours)</td><td>0</td><td>-1</td></tr><tr><td></td><td></td><td></td></tr></table>Bias = -2
Use step function as the activation (output 1 if sum ≥ 0, else 0).</td><td>2</td></tr>
<tr><td>Q. 15</td><td>Differentiate between training set and test set.</td><td>2</td></tr>
<tr><td>Q. 16</td><td>“Once the relevant projects have been selected and properly scoped, the next step of the machine learning lifecycle is the Design or Build phase.” Briefly explain this phase.</td><td>2</td></tr>
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Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)

Q. 17	Discuss the components of data storytelling in Artificial Intelligence. Explain how combining narrative, data, and visuals can lead to effective communication and decision-making.	**4**
Q. 18	Explain the characteristics and challenges of Big Data. Support your answer with examples of how Big Data is handled in real-world applications such as e-commerce or healthcare.	**4**
Q. 19	Describe the role and impact of neural networks in transforming AI technologies in the coming decade. Highlight key applications and societal benefits.	**4**
Q. 20	Explain the architecture and working of the Transformer model in Natural Language Processing (NLP). In your answer, include descriptions of the key components such as the multi-head attention mechanism, positional encoding, and the encoder-decoder structure.	**4**
Q 21	Explain Freytag’s Pyramid narrative structure and its application in data storytelling. Identify the key stages of the pyramid and describe their roles in presenting a compelling narrative with data	**4**

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