PRACTICE PAPER–4
CLASS X
ARTIFICIAL INTELLIGENCE (CODE 417)

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. **(1 × 4 = 4 marks)**

(i) "Before making a significant investment decision, Arjun gathered relevant information, analyzed the risks and benefits, and carefully considered all alternatives." Which self-management skill is clearly visible in the given statement?

(ii) _____ sentences express an idea or emotion.

(a) Exclamatory (b) Interrogative
(c) Imperative (d) Assertive

(iii) **Assertion (A):** Entrepreneurs require a lot of initial capital to start a business.
Reasoning (R): Modern entrepreneurship often relies on innovative ideas and lean startup methods.

(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.

(iv) Entrepreneurs who prioritize environmental sustainability in their businesses are _____.

(a) Social Entrepreneurs (b) Rural Entrepreneurs
(c) Youth Entrepreneurs (d) Environmental Entrepreneurs

(v) What is the primary function of a Firewall?

(a) Speeding up network connection (b) Monitoring the network bandwidth
(c) Filtering the network (d) Logging network activity

(vi) Which of the following is a non-renewable source of energy?

(a) Tidal Energy (b) Biomass Energy
(c) Natural Gas (d) Hydroelectricity

2. Answer any 5 out of the given 6 questions. **(1 × 5 = 5 marks)**

(i) **Assertion (A):** Google Forms is an example of structured data.

Reasoning (R): Structured data is typically organized in a way that makes it easy to search and analyze, often arranged in tables with rows and columns.

(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.

(ii) Which of the following is an application of Natural Language Processing?

(a) Image recognition (b) Classifying a message

(c) Generating essay on a topic (d) Decrypting a message

(iii) Which of these is an example of clustering in unsupervised learning?

(a) Identifying spam emails

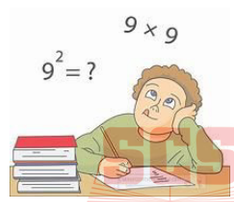
(b) Grouping customers based on purchasing power

(c) Predicting housing prices based on size and location

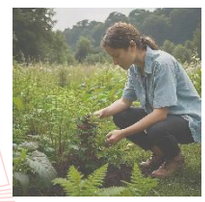
(d) Translating English to Hindi

(iv) Which of the following images best represents verbal-linguistic intelligence?

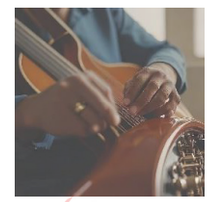
(a)



(b)



(c)



(d)

(v) Which of the following is an unauthentic source of data?

(a) Air Quality Monitors (b) News Aggregator

(c) APIs (Application Programming Interface) (d) Journal Articles

(vi) What is the formula for Recall?

(a) Recall = (True Positive / All Predicted Positives)

(b) Recall = (True Positive / All Actual Positives)

(c) Recall = (True Negative / All Predicted Negatives)

(d) Recall = (True Negative / All Actual Negatives)

3. Answer any 5 out of the given 6 questions. **(1 × 5 = 5 marks)**

(i) What is the Predicted and Actual value for a False Positive?

(a) Prediction = False, Actual = False (b) Prediction = False, Actual = True

(c) Prediction = True, Actual = False (d) Prediction = True, Actual = True

(ii) What is the primary purpose of AI model evaluation in AI project cycle?

(a) Selecting the best modelling method (b) Assessing model performance

(c) Reducing model complexity (d) Preparing data for training

(iii) Which of the following statements is accurate about stemming and lemmatization?

(a) Both stemming and lemmatization give the same results.

(b) Stemming may create non-words and lemmatization uses parts-of-speech tagging.

(c) Lemmatization is faster than stemming and more commonly used in real time.

(d) Stemming uses context to determine word forms but lemmatization does not.

(iv) Which of the following is NOT an application of NLP?

(a) Google Translate (b) Video Compression

(c) Auto Summarization (d) Speech-to-Text

(v) Identify the machine learning model type:

This model makes decisions or predictions by forming rules from labelled training data. It requires a well-defined input and output structure and works best with structured datasets.

(vi) In computer vision, _____ is the process of identifying distinct objects in an image by separating them into meaningful regions.

4. Answer any 5 out of the given 6 questions. **(1 × 5 = 5 marks)**

(i) Priya learned about an AI algorithm that learns from rewards and punishments in an environment to optimize its actions but she forgot its name. What is the term used for this learning approach?

(ii) **Statement 1:** Reinforcement Learning is a domain of AI that uses experience as the main source for training.

Statement 2: Unsupervised Learning is a domain of AI that uses labelled data as the main source for training.

(a) Both Statement 1 and Statement 2 are correct.

(b) Both Statement 1 and Statement 2 are incorrect.

(c) Statement 1 is correct but Statement 2 is incorrect.

(d) Statement 2 is correct but Statement 1 is incorrect.

(iii) Neha developed a chatbot that interacts with users and learns from the conversations to improve future interactions. Which of the following is NOT true about her chatbot?

(a) The chatbot uses reinforcement learning for improving responses.

(b) Supervised learning is not required for initial training.

(c) The chatbot can adapt over time based on user feedback.

(d) The chatbot does not need any dataset for training.

(iii) Which kind of data cannot be ranked?

(a) Continuous (b) Discrete (c) Ordinal (d) Nominal

(v) _____ helps to accurately determine the location and position of a single object in an image.

(a) Classification (b) Segmentation

(c) Localization (d) Image Enhancement

(vi) Riya designed a sentiment analysis model that performs exceptionally well on short texts like tweets but fails to analyze sentiments in longer reviews effectively. What is the term used for a situation where the model performs well in one context but fails in others?

5. Answer any 5 out of the given 6 questions. **(1 × 5 = 5 marks)**

(i) Karan created a robot that learns to navigate a maze by trial and error, improving its performance over time by receiving rewards for correct decisions. Identify the domain of AI in this context.

(a) Supervised Learning (b) Reinforcement Learning

(c) Data Science (d) None of these

(ii) Which of the following is an example of unstructured data?

(a) Excel spreadsheets (b) CSV files

(c) Relational database (d) Facebook post

(iii) Which of the following is a common task in computer vision?

(a) Image Classification (b) Speech Recognition

(c) Text Summarization (d) Sentiment Analysis

(iv) During the modelling phase of chatbot development, which of the following steps is typically undertaken?

(a) Conducting data exploration

(b) Collecting feedback from user

(c) Designing the structure and conversation flow of chatbot

(d) Testing real-time performance of chatbot

(v) In which stage of AI Project Cycle do we create a mathematical representation of our problem?

(a) Modelling (b) Evaluation

(c) Problem Scoping (d) Data Exploration

(vi) _____ is the last step of AI Project Cycle.

SECTION B – SUBJECTIVE TYPE QUESTIONS

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

6. How do the 4Rs align with sustainable development goals and how can they be applied in daily life to reduce waste?

7. What qualities distinguish successful entrepreneurs and how do these qualities enable them to adapt to challenges?

8. What external barriers to communication often hinder collaboration in workplaces or communities and how can they be mitigated?

9. What is a firewall and in what ways does it protect a computer system from cyber threats? Discuss its limitations.

10. Stress can be categorized into two types. How do these types of stress influence personal growth and mental health?

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

11. AI systems can be biased due to the data they are trained on. How can developers address AI bias and ensure fairness and inclusivity in AI applications?

12. A healthcare team wants to detect anomalies in patients' health data to identify rare diseases. They don't have prior labels for the conditions. What learning approach should they choose and why?

13. Vikram has developed a regression model and wants to evaluate its performance. What two metrics should he consider to assess the effectiveness and reliability of the model?

14. In the sentence, 'He is not only talented but also hardworking', identify and explain any two words that should not be removed during stopword filtering to preserve the sentence's meaning.

15. What is the need to explore data while making an AI model?

16. Draw the confusion matrix for the following data

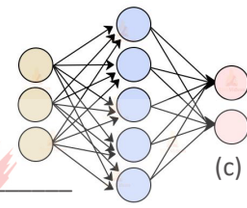
- the number of true positives = 400
- the number of true negatives = 350
- the number of false positives = 75
- the number of false negatives = 25

Answer any 3 out of the given 5 questions in 50–80 words each. (4 x 3 = 12 marks)

17. Your younger cousin hears you talking about machine learning and asks what it means. Explain the term 'machine learning' to them in simple words and give an example of how it works in everyday life.

18. Riya wants to evaluate her AI model for predicting house prices. Explain to her how to use metrics like accuracy, precision and recall during the evaluation phase and why these metrics are essential for assessing the model's performance.

19. Label the layers in the given image. Explain the role of each layer.



20. Explain underfitting and overfitting using diagram.

21. An AI-powered marketing tool predicts customer purchases with the following Confusion Matrix. Calculate the value of Precision and Recall. Explain the trade-off between them.

	Reality (Buy)	**Reality (Not Buy)**
Prediction (Buy)	35	25
Prediction (Not Buy)	15	45