CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Artificial Intelligence

Subject Code: 417 | Class X

Solutions

Sample Question Paper – Set 5

Time Allowed: 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 and 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.
8. Part A (Employability Skills) carries 10 marks and Part B (Subject Specific Skills) carries 40 marks. Practical work (50 marks) is assessed separately.

Exam Pattern

Section	Type of Questions	No. of Qs	Marks each	Total Marks
A	Q1: Objective (MCQ) – Employability Skills (answer any 4 of 6)	6 (any 4)	1	4
A	Q2–Q5: Objective (MCQ / Assertion–Reason / fill-in / one-word) – Subject Specific Skills (answer any 5 of 6 in each)	24 (any 20)	1	20
B	Q6–Q10: Short Answer (20–30 words) – Employability Skills (answer any 3 of 5)	5 (any 3)	2	6
B	Q11–Q16: Short Answer (20–30 words) – Subject Specific Skills (answer any 4 of 6)	6 (any 4)	2	8
B	Q17–Q21: Long Answer / Case-based (50–80 words) – Subject Specific Skills (answer any 3 of 5)	5 (any 3)	4	12
	Total	**46 items in 21 Qs (any 34)**		**50**

Unit-wise Weightage of Marks

Unit	Unit Name	Chapter	Marks
A-1	Communication Skills – II	Ch. 1	2
A-2	Self-Management Skills – II	Ch. 2	2

Unit	Unit Name	Chapter	Marks
A-3	ICT Skills – II	Ch. 3	2
A-4	Entrepreneurial Skills – II	Ch. 4	2
A-5	Green Skills – II	Ch. 5	2
B-1	Revisiting AI Project Cycle & Ethical Frameworks for AI	AI project cycle; AI domains; ethical frameworks; bioethics	7
B-2	Advanced Concepts of Modeling in AI	AI vs ML vs DL; rule/learning based; supervised, unsupervised, reinforcement; ANN/CNN; neural networks	11
B-3	Evaluating Models	Evaluation; train-test split; accuracy & error; confusion matrix; precision, recall, F1; ethics	10
B-4	Statistical Data	Assessed through practicals only	–
B-5	Computer Vision	CV applications & tasks; pixels, resolution, grayscale & RGB images	4
B-6	Natural Language Processing	Applications; stages of NLP; chatbots; text normalisation; BoW; TF-IDF	8
B-7	Advance Python	Assessed through practicals only	–
	Total		**50**

SECTION – A

Objective Type Questions (24 marks)

Q1. Answer any 4 out of the given 6 questions on Employability Skills (1 × 4 = 4 marks) **[4]**

(i) Which type of non-verbal communication is shown by actions like raising a hand to greet or pointing a finger at someone?

(a) Facial Expression (b) Posture (c) Gesture (d) Eye Contact

(ii) Which of these is non-specific feedback?

(a) You missed two steps in the lab procedure. (b) Your work is nice.
(c) Your sentences were well structured. (d) You wrote 40 words in the answer.

(iii) You take ownership of a task, complete it sincerely, and report honestly even if it is delayed. Which skill does this describe?

(a) Self-awareness (b) Responsibility (c) Time management (d) Adaptability

(iv) Cleaning the keyboard, cleaning the monitor and dusting the CPU are part of:

(a) Daily maintenance (b) Monthly maintenance
(c) Weekly maintenance (d) Yearly maintenance

(v) An entrepreneur listens calmly to an angry customer and does not lose temper. Which quality is shown?

(a) Impatience (b) Patience (c) Dependency (d) Anger

(vi) Which of these is a green skill practice?

(a) Using solar energy (b) Cutting trees for fuel
(c) Dumping e-waste (d) Overusing chemical fertilisers

Q2. Answer any 5 out of the given 6 questions (1 × 5 = 5 marks) **[5]**

(i) Which of the following is NOT a principle of bioethics?

(a) Respect for autonomy (b) Do not harm
(c) Maximise processing speed (d) Give justice

(ii) With respect to the type of data fed into an AI model, AI models can be broadly categorised into how many domains?

(a) Two (b) Four (c) Three (d) Five

(iii) In a neural network, what is the function of the input layer?

(a) It receives and passes the raw input data to the hidden layers.
(b) It performs mathematical operations on the input data.
(c) It connects neurons to the output layer for predictions.
(d) It stores weights and biases for neural network training.

(iv) Why is it not recommended to evaluate a machine learning model using the same data on which it was trained?

(a) It helps the model learn faster
(b) It may lead to overfitting and give an overly optimistic accuracy
(c) It reduces bias in the dataset
(d) It improves the performance of the model on unseen data

(v) A monitor displays 1366 × 768 pixels. What is the total number of pixels?

(a) 2,134 (b) 768 (c) 1,366 (d) 1,049,088

(vi) The sentence 'The fox jumped into the dog' is grammatically correct but has no sensible meaning. Which stage of NLP would reject it?

(a) Lexical analysis (b) Syntactic analysis
(c) Semantic analysis (d) Discourse integration

Q3. Answer any 5 out of the given 6 questions (1 × 5 = 5 marks) **[5]**

(i) The first stage of the AI Project Cycle is _____.

(ii) In a perceptron, the inputs are combined by:

(a) A weighted sum of the inputs plus a bias (b) Multiplying all inputs together
(c) Sorting the inputs by value (d) Taking the average of the labels

(iii) _____ is defined as the percentage of correct predictions out of all the observations.
(a) Precision (b) Recall (c) Accuracy (d) F1

(iv) **Assertion (A):** Underfitting occurs when a model is too simple to capture the patterns in the data.
Reason (R): An underfitted model gives poor accuracy even on its training 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.

(v) **Assertion (A):** A byte image pixel uses 16 bits.
Reason (R): One byte consists of 8 bits.
(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.

(vi) Which word is most likely to have the lowest TF-IDF value?
(a) A rare word that occurs in only one document
(b) The stop word 'the' that occurs frequently in every document
(c) A subject word that occurs many times in one document only
(d) A word that appears in exactly two of ten documents

Q4. Answer any 5 out of the given 6 questions ($1 \times 5 = 5$ marks) **[5]**

(i) What do frameworks provide in the context of problem-solving?
(a) Random solutions (b) Legal advice
(c) Step-by-step guidance (d) Hardware designs

(ii) In a neural network node, the _____ is an extra value added to the weighted sum to shift the output.

(iii) With reference to the evaluation process of an AI model, define the term True Positive.

(iv) A model that performs poorly on both training and testing data is said to be suffering from _____.

(v) The fully connected layer of a CNN is used to:
(a) combine extracted features and produce the final class output
(b) slide a kernel across the image
(c) store pixel values in bytes
(d) split data into training and testing sets

(vi) _____ is the process of removing affixes from a word to reach its base form, which may not always be a meaningful word.

Q5. Answer any 5 out of the given 6 questions ($1 \times 5 = 5$ marks) **[5]**

(i) As AI is essentially being used as a decision-making / influencing tool, we need to ensure that AI makes morally acceptable recommendations. Which of the following is a key factor that can knowingly or unknowingly influence our decision-making while designing an AI model?
(a) Algorithm efficiency (b) Data storage capacity
(c) Processing speed (d) Intuition and Values

(ii) Which scenario is a classification problem?
(a) Predicting the price of a house in Rs. lakh
(b) Predicting the rainfall amount in mm
(c) Identifying whether a loan applicant will default (Yes/No)
(d) Predicting the marks a student will score

(iii) Which metric should be given more importance when missing an actual disease case is very costly?
(a) Recall (b) Precision
(c) Error rate on training data (d) Training accuracy

(iv) Which statement correctly describes image processing?
(a) It enhances or transforms an image, such as changing brightness or rescaling
(b) It only classifies objects into categories
(c) It converts speech into text
(d) It draws labelled boxes around people only

(v) **Assertion (A):** Tokenisation is necessary before Bag of Words can count words.
Reason (R): Bag of Words needs tokens to build the vocabulary and count word frequencies.
(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.

(vi) Why is the Bag of Words model called a 'bag'?
(a) Words must appear in the same order
(b) Only the first word is counted
(c) The order of tokens does not matter
(d) Words are stored in a file

SECTION – B

Subjective Type Questions (26 marks)

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

Q6. List two best practices for effective communication. **[2]**

Q7. Write two ways a student can practise self-regulation during exams. **[2]**

Q8. List any two tasks in a weekly maintenance schedule. **[2]**

Q9. Differentiate between wage-employed people and self-employed people. **[2]**

Q10. Enlist any two SDGs which are formulated to address the problems related to water. **[2]**

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

Q11. Name the six stages of the AI Project Cycle in the correct order. **[2]**

Q12. What is a neural network? How is it inspired by the human brain? **[2]**

Q13. What are features and labels in a dataset? Give one example of each. **[2]**

Q14. Give one example each where recall is preferred and where precision is preferred. **[2]**

Q15. What is ReLU? Explain its function in a CNN. **[2]**

Q16. Identify the stage of NLP and explain it. 'We are to the zoo going tomorrow.' and 'We are going to the zoo tomorrow.' **[2]**

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

Q17. What is the significance of the AI project cycle? Also explain how Data Acquisition is different from Data Exploration. **[4]**

Q18. Explain the difference between classification and clustering, with one example of each. **[4]**

Q19. Explain how a regression model and a classification model differ, using one example for each. **[4]**

Q20. Describe the process of evaluating an AI model using the train-test split. Why must the testing data be unseen by the model during training? **[4]**

Q21. Explain the five stages of NLP (lexical, syntactic, semantic, discourse integration and pragmatic analysis) with one example for each. **[4]**

***** END OF PAPER *****