CENTRAL BOARD OF SECONDARY EDUCATION

# CBSE 2026-27

## Artificial Intelligence

Subject Code: 417 | Class X

Solutions

## Sample Question Paper – Set 2

**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) The sentence that states the main idea of a paragraph is the:
(a) Concluding sentence (b) Supporting sentence
(c) Topic sentence (d) Transition word

(ii) Recognising one's own strengths, weaknesses and emotions is called:
(a) Self-motivation (b) Delegation (c) Procrastination (d) Self-awareness

(iii) Which software starts working as soon as a computer is switched on and displays the desktop?
(a) Operating system (b) Web browser (c) Antivirus (d) Word processor

(iv) What is the action called when you place the mouse pointer over a file in File Explorer and it displays the file's details without clicking?
(a) Click (b) Drag (c) Scroll (d) Hover

(v) Which of these is a myth about entrepreneurship?
(a) Entrepreneurs make decisions about production
(b) Entrepreneurs take calculated risks
(c) Every business idea needs to be unique or special
(d) Entrepreneurs manage raw materials

(vi) Efforts are made to increase solar power generation so that our electricity needs are met and at the same time we do not pollute the environment or use up natural resources. Which SDG can you relate this statement to?
(a) Life on land (b) Affordable and clean energy
(c) Clean water and sanitation (d) Reduced inequalities

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

(i) With respect to the type of data fed into the AI model, AI models can be broadly classified into _____ domains.

(ii) The primary domain of application for Bioethics is:
(a) Agriculture (b) Environmental conservation
(c) Information technology (d) Healthcare and life sciences

(iii) **Assertion (A):** An artificial neural network can extract data features automatically.
**Reason (R):** Its nodes adjust weights and biases during training to learn from data, so the programmer does not need to specify the features.
(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.

(iv) When a model is evaluated on the training data, it always predicts correctly but performs poorly on unseen data. This is known as _____.

(v) The three AI domains are Statistical Data, Natural Language Processing and _____.

(vi) Ayushi wanted to know the term used for the whole textual data from all the documents taken together. What is this term?

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

(i) Which of the following is the second stage of an AI Project Cycle?
(a) Problem Scoping (b) Evaluation (c) Data Exploration (d) Data Acquisition

(ii) The training dataset is used to:
(a) Test the final accuracy of a model (b) Store the deployed model
(c) Teach the model patterns from examples (d) Count the number of instances

(iii) **Assertion (A):** A confusion matrix is used to evaluate classification models.

**Reason (R):** For a binary classification problem, a confusion matrix has two rows and two columns.
(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.

(iv) A model made 850 correct predictions out of 1000 predictions. Its accuracy is:
(a) 0.15 (b) 0.85 (c) 0.75 (d) 0.885

(v) _____ is the process of finding instances of real-world objects in images or videos.
(a) Instance segmentation (b) Object detection
(c) Classification (d) Image segmentation

(vi) **Assertion (A):** The term frequency of a word is always 1.
**Reason (R):** Term frequency counts how many times a word appears in a document.
(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.

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

(i) Which of the following contributes to the efficiency of an AI project?
(a) High model complexity (b) Relevant and authentic training data
(c) Minimal preprocessing (d) Limited hardware resources

(ii) In a neural network, a weight represents:
(a) The number of layers
(b) The strength or importance of a connection between two nodes
(c) The number of instances
(d) The label of a data point

(iii) Which of the following best defines overfitting?
(a) The model performs poorly on training data but well on testing data
(b) The model performs well on training data but poorly on unseen data
(c) The model uses too few features
(d) The model has zero error on every dataset

(iv) A model has TP = 30, TN = 50, FP = 10 and FN = 10 for 100 cases. What is its accuracy?
(a) 0.80 (b) 0.60 (c) 0.70 (d) 0.90

(v) The pooling layer in a CNN is used to:
(a) increase image resolution
(b) convert RGB images to grayscale
(c) predict the final class
(d) reduce the size of feature maps while keeping important features

(vi) Which stage of NLP checks grammar and rejects a sentence whose word order breaks the rules of grammar?
(a) Syntactic analysis (parsing) (b) Pragmatic analysis
(c) Discourse integration (d) Lexical analysis

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

(i) Which of the following is a sector-based ethical framework for AI?
(a) Rights-based framework (b) Bioethics
(c) Utility-based framework (d) Virtue-based framework

(ii) Which task is an example of supervised learning?
(a) Grouping shoppers with similar buying habits
(b) Finding items that are often bought together
(c) Learning to walk by trial and error
(d) Classifying emails as spam or not spam using emails already labelled

(iii) _____ is the proportion of actual positive cases that the model correctly identifies.

(iv) Google Search by Image allows a user to:
(a) translate an email
(b) detect spam in inbox
(c) upload a photo to find similar images and related web pages
(d) type a question using voice

(v) Which stage of NLP checks whether a sentence is relevant in the real world and identifies its intended meaning, discarding the literal word meaning?
(a) Lexical analysis (b) Syntactic analysis
(c) Pragmatic analysis (d) Discourse integration

(vi) Which NLP application converts natural speech into text in real time?
(a) Keyword extraction tool
(b) Translation of books from English to Hindi language
(c) Auto generated captions on YouTube
(d) Classifying raw text into pre-defined groups

## 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.** What is a pronoun? Give an example. **[2]**

**Q7.** In SMART goals, what does 'A' stand for? Explain. **[2]**

**Q8.** Explain why 'Ram123' is a weaker password than 'R@m!2026q'. **[2]**

**Q9.** Reema runs a small handmade soap business. Every morning, she decides what products to make, how many soaps to produce, and where to sell them. She also arranges raw materials and assigns tasks to her staff. Identify the two functions of an entrepreneur that are being described. **[2]**

**Q10.** What is organic farming? Mention any two benefits of practising organic farming. **[2]**

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

**Q11.** Explain the difference between sector-based and value-based ethical frameworks with one example of each. **[2]**

**Q12.** How is reinforcement learning different from supervised and unsupervised learning? **[2]**

**Q13.** Identify the type of deep learning model in each description. (a) This model processes input images by learning to assign importance (weights and biases) to various features in the image, which allows it to distinguish one object from another. (b) This model is inspired by the structure of the human brain and can automatically extract features from large datasets without explicit programming. **[2]**

**Q14.** Explain the train-test split technique with respect to a machine learning algorithm. **[2]**

**Q15.** Explain the term resolution with an example. **[2]**

**Q16.** Give two differences between a script bot and a smart bot. **[2]**

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

**Q17.** Read the following and answer the questions that follow: **[4]**

A company aimed to support hospitals in optimizing patient care by creating an AI algorithm designed to identify individuals at high risk, so that healthcare providers could allocate resources effectively and ensure those most in need receive appropriate attention. However, patients from the western region of a particular area, who were categorized at the same risk level by the algorithm, generally exhibited more severe health

conditions compared to patients from other regions.

(i) State the two reasons why the problem happened. (2)

(ii) Name the ethical framework whose principles can ensure an ethical AI solution here, and state the principle which requires that the training data be unbiased. (2)

**Q18.** Explain the terms features, labels, instances and training data, with one example of each from a school's student dataset. **[4]**

**Q19.** A system of organised machine learning algorithms is shown as follows. Data is fed to a first column of identical nodes, each node applies a machine learning algorithm with hidden rules, the result passes through a second column of identical nodes, and finally an Answer is produced as output. (a) Identify the concept. (b) Explain its working. **[4]**

**Q20.** Read the following and answer the questions that follow: **[4]**

A sentiment analysis model classifies 500 movie reviews as Positive or Negative. Its confusion matrix is given below.

| | **Reality: Positive** | **Reality: Negative** |
|---|---|---|
| Predicted: Positive | 300 | 40 |
| Predicted: Negative | 60 | 100 |

(i) How many total cases are True Positive? (1)

(ii) Calculate the precision. (1)

(iii) Calculate the recall. (1)

(iv) Calculate the F1 score. (1)

**Q21.** Read the following and answer the questions that follow: **[4]**

A beginner compares two normalisation methods. The table shows the stem produced by stemming and the lemma produced by lemmatisation for four words.

| **Word** | **Affix removed** | **Stem (stemming)** | **Lemma (lemmatisation)** |
|---|---|---|---|
| studies | -es | studi | study |
| flies | -es | fli | fly |
| wolves | -es | wolv | wolf |
| healing | -ing | heal | heal |

(i) Which entries in the Stem column are not meaningful words? (1)

(ii) Which of the two methods takes longer to execute, and why? (1)

(iii) Why does lemmatisation give 'study' for 'studies', while stemming gives 'studi'? (1)

(iv) Name the affix removed from 'healing'. Are the stem and the lemma the same here? (1)

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