CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Artificial Intelligence

Subject Code: 417 | Class X

Solutions

Sample Question Paper – Set 8

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 ($1 \times 4 = 4$ marks) **[4]**

(i) Which of these is a principle of effective communication?
(a) Ignoring the receiver's response (b) Using long, complicated sentences
(c) Avoiding feedback (d) Clarity of message

(ii) Meditation is useful for stress management because it:
(a) Increases anger (b) Stops all thinking permanently
(c) Improves concentration and calms the mind (d) Replaces sleep

(iii) After an anti-virus detects a virus, it usually:
(a) Adds it to the desktop (b) Shares it on the internet
(c) Cleans or removes it (d) Prints it

(iv) An entrepreneur believes in her own abilities and is sure she can succeed. Which quality is shown?
(a) Self-confidence (b) Shyness (c) Dependency (d) Laziness

(v) Which statement shows how entrepreneurs help a locality grow?
(a) When people buy and sell, everyone involved makes money
(b) Shops are forced to close
(c) Trade stops completely
(d) Money is kept hidden at home

(vi) Vermicomposting is the process of making manure using:
(a) Chemical fertilisers (b) Earthworms
(c) Plastic waste (d) Diesel

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

(i) **Assertion (A):** AI systems used for decision-making must make morally acceptable recommendations.
Reason (R): AI is essentially being used as a decision-making / influencing tool in society.
(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.

(ii) Write the four principles of bioethics (names only).

(iii) Which statement is TRUE about deep learning?
(a) It is a broader field than artificial intelligence.
(b) It is a subset of machine learning that uses multi-layer neural networks.
(c) It does not use data at all.
(d) It is the same as rule-based programming.

(iv) _____ is the outcome of the model wrongly predicting the negative class as the positive class.

(v) The task that assigns a class label to each pixel of an image is called _____.

(vi) How many tokens are there in the sentence 'NLP is fun!'? (Count the exclamation mark as a token.)

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

(i) Under the bioethics principle of justice, the benefits and burdens of a decision must be distributed:
(a) Only among those who can pay
(b) Irrespective of people's background, in a justified manner
(c) To the nearest hospital only
(d) Randomly

(ii) The data used to check the accuracy of a trained model on unseen examples is called _____ data.

(iii) A dataset is divided into 80% for training and 20% for testing. This is known as:
(a) Train-test split (b) Feature selection (c) Confusion analysis (d) Feature scaling

(iv) Statement 1: Overfitting occurs when a model memorises the training data rather than learning patterns.

Statement 2: Using the same data for training and evaluation helps the model give accurate results.
(a) Statement 1 is correct but statement 2 is incorrect.
(b) Both statements are correct.
(c) Both statements are incorrect.
(d) Statement 1 is incorrect but statement 2 is correct.

(v) Which computing component captures raw visual data for a CV system?
(a) Speaker (b) Keyboard
(c) Camera or image sensor (d) Printer

(vi) Which type of chatbot learns over time and builds on its knowledge from interactions?
(a) Script bot (b) Menu bot (c) Keyword bot (d) Smart bot

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

(i) Email filters that uncover certain words or phrases signalling spam are an example of:
(a) Computer Vision (b) Statistical Data
(c) Natural Language Processing (d) Clustering

(ii) Artificial neural networks are inspired by the structure of the:
(a) Solar system (b) Computer keyboard (c) Human brain (d) Printing press

(iii) **Assertion (A):** Recall is also known as sensitivity.
Reason (R): Recall is calculated as TP / (TP + FN).
(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) In spam email detection, which of the following will be considered a 'False Negative'?
(a) When a spam email is mistakenly identified as legitimate.
(b) When a legitimate email is accurately identified as not spam.
(c) When an email is accurately recognised as spam.
(d) When an email is inaccurately labelled as important.

(v) A self-driving car fails to detect pedestrians crossing at night, resulting in a near accident. Which domain of AI technology should be enhanced to improve safety?
(a) Natural Language Processing (b) Statistical Data
(c) Recommendation Systems (d) Computer Vision

(vi) Which NLP application converts text or speech from one language to another?
(a) Sentiment analysis (b) Keyword extraction
(c) Text classification (d) Language translation

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

(i) According to the bioethics principle of 'respect for autonomy' in AI healthcare, users of an AI algorithm should:
(a) Know how the algorithm functions, with reproducible and accessible training data
(b) Never be told how decisions are made
(c) Accept decisions without question
(d) Train the model themselves

(ii) **Assertion (A):** Training data must contain labels in supervised learning.
Reason (R): In supervised learning, correct outputs are provided with the examples so that the model learns the correct answers.
(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.

(iii) In the context of autonomous vehicle safety systems, which type of error would be most critical to minimise?

(a) False Positive (detecting danger when there isn't any)
(b) False Negative (failing to detect actual danger)
(c) True Positive (detecting danger correctly)
(d) True Negative (correctly identifying that there is no danger)

(iv) Which Computer Vision application translates text seen through a phone camera into another language?
(a) Sentiment analysis (b) Auto-generated captions
(c) Spam filter (d) Google Translate app

(v) Which of these is an example of a smart bot?
(a) A website pop-up with only fixed buttons
(b) An AI assistant that learns from conversations and answers new questions
(c) A printed quiz card
(d) A calculator

(vi) Which NLP tool automatically extracts the most used and important words and expressions from a text?
(a) Keyword extraction (b) Text classification
(c) Auto-generated captions (d) Language translation

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 descriptive feedback? Rewrite 'Your report is weak' as descriptive feedback. **[2]**

Q7. How does meditation help in managing stress? Discuss briefly. **[2]**

Q8. Why should temporary files be removed regularly? Explain. **[2]**

Q9. What is capital? Why is it needed to start a business? **[2]**

Q10. Define the term 'Sustainable Development'. **[2]**

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

Q11. What is Bioethics? Name its four principles. **[2]**

Q12. Give any two characteristics of a classification model. **[2]**

Q13. Explain classification with the help of an example. **[2]**

Q14. Explain transparency as an ethical concern in model evaluation. **[2]**

Q15. Explain how Google Search by Image works. **[2]**

Q16. What is the primary difference between human language and computer language? **[2]**

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

Q17. What are the types of ethical frameworks for AI? Explain each type briefly with one example. **[4]**

Q18. Explain the main components of a neural network: input layer, hidden layers, output layer, weights and biases. **[4]**

Q19. Explain clustering and association as two types of unsupervised learning, with one real-life example of each. **[4]**

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

A bank tests a fraud-detection model on 1000 card transactions, of which 20 are actually fraudulent. The model correctly flagged 15 fraudulent transactions (TP) and missed 5 (FN). It wrongly flagged 10 genuine transactions as fraud (FP); the other 970 genuine transactions were correctly passed (TN).

	Reality: Fraud	**Reality: Genuine**
Prediction: Fraud	15 (TP)	10 (FP)
Prediction: Genuine	5 (FN)	970 (TN)

(i) How many transactions are True Negatives? (1)

(ii) Calculate the accuracy of the model. (1)

(iii) Calculate the precision of the model. (1)

(iv) Which metric should the bank prioritise: precision or recall? Justify in one line. (1)

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

A data analyst cleans three customer reviews before analysis. R1: 'The phone is GREAT!' R2: 'Battery life is poor.' R3: 'Delivery was quick and the staff were helpful.'

(i) Write the tokens of R1 after converting to lowercase and removing punctuation. (1)

(ii) Name the stop words in R3. (1)

(iii) Why must 'GREAT' and 'great' be converted to a common case? (1)

(iv) How many tokens does R2 have, counting the full stop as a token? (1)

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