CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Artificial Intelligence

Subject Code: 417 | Class X

Marking Scheme – Sample Question Paper – Set 6

Time Allowed: 2 Hours **Maximum Marks: 50**

General Instructions

1. This marking scheme gives the value points and the mark split only; the questions are in Sample Question Paper Set 6.
2. Answers to questions numbered 1 to 5 are given sub-part wise (i)–(vi); a candidate answers any 4/any 5 of them as instructed in the paper.
3. Any other relevant answer, correctly written, should be given due credit.
4. Marks may be awarded for any correct part of a value point, as per the split shown.

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
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

Unit	Unit Name	Chapter	Marks
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**

Answers only. Section A answers are given sub-part wise (i)–(vi): a candidate attempts any 4 sub-parts of Q1 and any 5 of each of Q2–Q5, as instructed in the paper. Section B: any 3 of Q6–Q10, any 4 of Q11–Q16, any 3 of Q17–Q21.

SECTION – A

Answers to Objective Type Questions (24 marks)

Q1. [4]

(i) (c) Noise in the room [1]
(ii) (a) Negative thoughts [1]
(iii) (c) Measurable [1]
(iv) (a) Installing anti-virus software and a firewall [1]
(v) (c) By buying jute from the local farmer and by providing jobs to local women [1]
(vi) (b) Edible cutlery made from grain [1]

Q2. [5]

(i) (a) Problem Scoping, Data Acquisition, Data Exploration, Modelling, Evaluation – The steps match the first five stages; Deployment follows Evaluation. [1]
(ii) (c) Rights-based framework – The rights-based framework prioritises human rights and dignity, valuing human life over other considerations. [1]
(iii) (a) Labelled [1]
(iv) (a) Both A and R are correct, and R is the correct explanation of A. [1]
(v) (c) at every valid position of the image [1]
(vi) (d) play [1]

Q3. [5]

(i) (d) To ensure AI makes morally acceptable choices and avoid unintended outcomes – AI is used as a decision-making/influencing tool, so ethical frameworks ensure morally acceptable recommendations and prevent unintended outcomes. [1]
(ii) Label [1]
(iii) (d) Regression-type numerical predictions [1]
(iv) True [1]
(v) (a) Plain typed text documents [1]
(vi) (a) A vocabulary and the frequency of its words [1]

Q4. [5]

(i) (a) Both A and R are correct, and R is the correct explanation of A. [1]
(ii) (a) 1.7 – 0.6 + 0 + 0.5 + 0.3 = 1.4; adding the bias 0.3 gives 1.7. [1]
(iii) (d) 110 – TN = 200 - (60 + 20 + 10) = 110. [1]
(iv) (a) Viral Disease Outbreak [1]
(v) (d) A is incorrect, but R is correct. [1]
(vi) 32 [1]

Q5. [5]

(i) (d) Statistical Data – Price comparison websites are driven by lots of numeric data, which belongs to the Statistical Data domain (Data Sciences). [1]
(ii) (d) Hidden layer [1]
(iii) (b) The model is too simple to capture the pattern in the data [1]
(iv) Resolution [1]
(v) Any two of: voice assistants, language translation, sentiment analysis, autogenerated captions, keyword extraction, text classification, automatic summarisation [1]
(vi) (d) Lexical analysis [1]

SECTION – B

Answers to Subjective Type Questions (26 marks)

Q6. **[2]**

Interpersonal barrier: personal differences and conflict between individuals [1]
Resolve through open dialogue or mediation so ideas can flow freely [1]

Q7. **[2]**

Yoga [0.5]
Meditation [0.5]
Nature walks [0.5]
Vacations [0.5]

Q8. **[2]**

Encryption converts data into a coded form that only authorised users can read [1]
It protects customer information from theft and misuse [1]

Q9. **[2]**

Every business idea needs to be unique or special [1]
A person needs a lot of money to start a business [1]

Q10. **[2]**

Air pollution: caused by vehicle exhaust and factory smoke [1]
Water pollution: caused by dumping garbage and waste into rivers and ponds [1]

Q11. **[2]**

NLP is a branch of AI that deals with the interaction between computers and humans using natural language; it extracts information from spoken and written words, with the objective of making machines read, decipher and understand human languages. [1]
Any two applications: email/spam filters, machine translation (Google Translate, Microsoft Translator). [1]

Q12. **[2]**

Reinforcement learning is learning by trial and error, where an agent gets rewards for good actions and penalties for bad ones. [1]
Example: a robot learning to park a car by receiving rewards for correct moves. [1]

Q13. **[2]**

Labelled data has the correct output tag attached, for example a photo tagged 'dog'. [1]
Unlabelled data has no tags, for example a set of random animal photos with no names. [1]

Q14. **[2]**

Error is the absolute difference between the actual and predicted values: |actual - predicted|. [1]
Error rate is the error divided by the actual value, giving a proportion: |actual - predicted| / actual. [1]

Q15. **[2]**

Automated checkout and product recognition, where cameras identify items at billing counters. [1]
Shelf monitoring and stock tracking, where cameras detect empty shelves or misplaced products. [1]

Q16. **[2]**

Tokenisation splits a sentence into tokens (words, numbers and special characters); e.g. 'Ram!' gives the tokens 'Ram' and '!'. [1]
Stop-word removal deletes frequent, low-value words; e.g. 'is' and 'the' are removed from 'The sky is blue'. [1]

Q17. **[4]**

(i) Users of the AI algorithm should know how it functions [1]
(ii) Do not harm: the algorithm must be trained on datasets that equitably reduce harm for all groups; as it stands, it actively harms the community's patients by inappropriately allocating healthcare resources [1]

Q18. [4]

Grouping students into clusters uses unsupervised learning (clustering). [1]
It works on unlabelled data and finds similar groups without predefined labels. [1]
Predicting exam marks uses supervised learning (regression). [1]
It learns from labelled past data and predicts a continuous numerical value. [1]

Q19. [4]

First chatbot: rule-based approach. [1]
Second chatbot: learning-based approach. [1]
Limitation of the first: it cannot answer questions its rules do not cover, and it cannot adapt on its own. [1]
The learning-based chatbot improves as it sees more conversations and feedback. [1]

Q20. [4]

(i) 80 + 20 = 100 patients have the disease. [1]
(ii) Accuracy = (80 + 360) / 500 = 0.88 (88%). [1]
(iii) Precision = 80 / (80 + 40) = 0.67 (rounded). [1]
(iv) Recall = 80 / (80 + 20) = 0.8 (80%). [1]

Q21. [4]

(i) DF(water) = 2 (Doc 1 and Doc 2); DF(crops) = 2 (Doc 2 and Doc 3). [1]
(ii) IDF(farmer) = 3 ÷ 1 = 3, since 'farmer' occurs in only one document. [1]
(iii) 'the': it occurs with the same high frequency in all three documents and adds no value to the corpus. [1]
(iv) 'farmer': TF-IDF = 1 × log10(3), about 0.48; 'water' gives 2 × log10(1.5), about 0.35; 'the' gives 0. [1]

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