CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Artificial Intelligence

Subject Code: 417 | Class X

Marking Scheme – Sample Question Paper – Set 4

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 4.
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) Your presentation kept the audience engaged because you used clear examples. – It names an observed behaviour and its effect, without judging the person. [1]
(ii) (c) Making decisions purely based on emotions [1]
(iii) (c) Ta9#Qm2! [1]
(iv) (b) Creating a new method, idea or product [1]
(v) (b) SDG 8 [1]
(vi) (a) Reduce [1]

Q2. [5]

(i) (a) Both A and R are correct, and R is the correct explanation of A. [1]
(ii) Bioethics [1]
(iii) (b) Unsupervised learning [1]
(iv) (d) 0.67 – F1 = $2 \times 1 \times 0.5 / (1 + 0.5) = 0.67$. [1]
(v) Localisation (Localization) [1]
(vi) 1 [1]

Q3. [5]

(i) (a) Only (i) – AI models are categorised into three (not four) domains; statements (ii), (iii) and (iv) are correct. [1]
(ii) (d) A is incorrect, but R is correct. [1]
(iii) (c) Recall [1]
(iv) (c) The actual value is positive and the prediction is positive [1]
(v) (a) Each pixel has one intensity value [1]
(vi) (b) the number of times the word appears in that document [1]

Q4. [5]

(i) (c) Sector-based and value-based frameworks – The two main types of ethical frameworks are sector-based and value-based. [1]
(ii) Supervised [1]
(iii) (d) TP / (TP + FP) [1]
(iv) (d) Overfitted [1]
(v) (b) Computer Vision [1]
(vi) (a) Both A and R are correct, and R is the correct explanation of A. [1]

Q5. [5]

(i) (d) Virtue-based framework – The virtue-based framework focuses on the character and intentions of the people involved in decision-making. [1]
(ii) (d) Predicting tomorrow's temperature. [1]
(iii) True Negative (TN) [1]
(iv) (b) A small matrix of weights that slides over the image [1]
(v) (a) Stop word [1]
(vi) (a) Script Bot [1]

SECTION – B

Answers to Subjective Type Questions (26 marks)

Q6. [2]

Specific feedback points to an exact behaviour, e.g. 'Your introduction clearly stated the aim' [1]
Non-specific feedback is vague, e.g. 'Good job', and gives no direction [1]

Q7. **[2]**

(a) Ability to recognise, understand and manage one's own emotions and those of others [1]
(b) Any two of: self-awareness, self-regulation, motivation, empathy, social skills [1]

Q8. **[2]**

A type of malware that disguises itself as useful software [1]
Once installed, it behaves like a virus and destroys or steals data [1]

Q9. **[2]**

Survive: the entrepreneur must remain in a competitive market with many other businesses [1]
Grow: once the business is stable, the entrepreneur thinks about expanding it [1]

Q10. **[2]**

Deforestation [0.5]
Overexploitation of resources [0.5]
Industrial and atmospheric pollution [0.5]
E-waste generation [0.5]

Q11. **[2]**

Ethical frameworks are frameworks which help us ensure that the choices we make do not cause unintended harm; they give a systematic approach to navigating complex moral dilemmas. [1]
AI is used as a decision-making / influencing tool, so ethical frameworks ensure that AI makes morally acceptable choices and help avoid unintended outcomes before they take place. [1]

Q12. **[2]**

Types: supervised, unsupervised and reinforcement learning. [1]
Applications: spam detection (supervised) and grouping customers (unsupervised). [1]

Q13. **[2]**

A weight shows the strength or importance of a connection between two nodes. [1]
A bias is an extra value that shifts the weighted sum, making the node's output more flexible. [1]

Q14. **[2]**

Overfitting: the model learns the training data too closely, including noise; it performs very well on training data but poorly on new data (for example, memorising answers without understanding). [1]
Underfitting: the model is too simple to learn the pattern, so it performs poorly even on training data (for example, a straight line fitted to clearly curved data). [1]

Q15. **[2]**

Each pixel is stored as three values, one each for the Red, Green and Blue channels. [1]
Each channel value is stored as a byte (0 to 255), so one pixel needs 3 bytes and about 16.7 million colours are possible. [1]

Q16. **[2]**

Stemming chops off affixes and may give a non-meaningful stem; lemmatisation gives a meaningful base word (lemma). [1]
Stemming gives 'wolv'; lemmatisation gives 'wolf'. [1]

Q17. **[4]**

(i) Reason 1: the algorithm unfairly penalized students who are not fluent in English, assuming slower form completion indicates lower competence, when it may simply reflect language challenges [1]
(ii) Do Not Harm: the algorithm unintentionally harms students from less privileged backgrounds by reducing their chances of selection; it should be redesigned to avoid unfair disadvantages [1]

Q18. [4]

(a) Unsupervised learning. [1]
(b) Clustering and Association. [1]
(c) Clustering finds similarities between objects and places them in the same cluster; example: grouping customers by purchasing behaviour (1). Association finds relationships between variables in large datasets; example: market basket analysis, such as customers who buy bread often buy butter (1). [2]

Q19. [4]

Situation 1 is supervised learning, since labelled data is used to train the model. [1]
The labels act as a supervisor that gives the correct answers, and the model learns to map features to the labels. [1]
Situation 2 is unsupervised learning, since unlabelled data is used to find patterns. [1]
The machine groups similar animals by their features without knowing their names (clustering). [1]

Q20. [4]

(i) Bias: the model performs unfairly for one group of patients. [1]
(ii) The overall accuracy is dominated by the majority group (men), so the poor result for women is averaged out. [1]
(iii) Transparency. [1]
(iv) Use representative, balanced test data and report accuracy for each group. [1]

Q21. [4]

(a) Dictionary: students, love, studying, ai, is, transforming, education, teachers, and, explore, tools (11 unique words). [1]
(b) Document 3 vector: students 1, love 0, studying 0, ai 1, is 0, transforming 0, education 0, teachers 1, and 1, explore 1, tools 1. [1]
(c) It converts each document into a fixed-length numeric vector of word counts, which a machine learning model can process, e.g. for classification. [1]
(d) It records only which words occur and how often, not their grammar or position; the text is treated as a bag of words, so order is ignored. [1]

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