CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Artificial Intelligence

Subject Code: 417 | Class X

Marking Scheme – Sample Question Paper – Set 3

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 3.
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) Feedback [1]
(ii) (d) achievable [1]
(iii) (c) Trojan Horse [1]
(iv) (a) Grow [1]
(v) (b) A businessman [1]
(vi) (c) Collect and store rainwater for later use [1]

Q2. [5]

(i) (d) Problem Scoping – Under Problem Scoping, we look at various parameters which affect the problem so that the picture becomes clearer. [1]
(ii) (d) Data Exploration – In Data Exploration, the acquired data is given a visual form so that patterns can be interpreted easily. [1]
(iii) (b) Machine Learning is a subset of Artificial Intelligence. [1]
(iv) (b) 0.83 – Precision = 50 / (50 + 10) = 0.83. [1]
(v) True [1]
(vi) (b) Smart bot [1]

Q3. [5]

(i) Deployment [1]
(ii) (c) To evaluate the model's accuracy. [1]
(iii) (c) 0.80 – Recall = 40 / (40 + 10) = 0.80. [1]
(iv) Accuracy [1]
(v) (b) feature map [1]
(vi) (d) A is incorrect, but R is correct. [1]

Q4. [5]

(i) (b) Problem Scoping, Data Acquisition, Data Exploration, Modelling, Evaluation – Deployment follows Evaluation as the sixth stage, so the listed order is correct apart from the final Deployment stage. [1]
(ii) Unsupervised [1]
(iii) (b) Precision and Recall [1]
(iv) (c) the dataset is highly imbalanced [1]
(v) (a) Instance segmentation [1]
(vi) (d) Stemmed: fli, Lemmatized: fly [1]

Q5. [5]

(i) (d) A is incorrect, but R is correct. [1]
(ii) (a) Features [1]
(iii) (b) Both A and R are correct, but R is not the correct explanation of A. [1]
(iv) (a) 1 [1]
(v) True [1]
(vi) (b) Sentiment analysis [1]

SECTION – B

Answers to Subjective Type Questions (26 marks)

Q6. [2]

Clear, Concise, Concrete, Correct [1]
Coherent, Complete, Courteous [1]

Q7. **[2]**

Self-regulation is controlling one's emotions, impulses and behaviour to reach goals [1]
E.g. staying calm and not replying in anger when a friend is rude [1]

Q8. **[2]**

A worm replicates itself and spreads to all files, which makes it hard to remove [1]
A Trojan Horse disguises itself as useful software and then destroys data [1]

Q9. **[2]**

An entrepreneur keeps trying new ideas to grow, while a businessman keeps running the business the same way [1]
An entrepreneur takes risks and expands the business; a businessman usually keeps to routine [1]

Q10. **[2]**

Mr Avasth Hedge made a 100 per cent biodegradable bag that dissolves in hot water [1]
Narayana Peesapaty made edible cutlery from grain that decomposes in soil [1]

Q11. **[2]**

Second stage (Data Acquisition): we acquire data which becomes the base of the project, collecting it from various reliable and authentic sources. [1]
Third stage (Data Exploration): we give the acquired data a visual representation using graphs, databases, flow charts, maps, etc., which helps us interpret patterns and draw insights easily. [1]

Q12. **[2]**

Supervised learning uses labelled data; unsupervised learning uses unlabelled data. [1]
Supervised learning predicts known outputs (classification, regression); unsupervised learning discovers hidden patterns or groups (clustering, association). [1]

Q13. **[2]**

Hidden layers do the actual processing, using weights and biases at each node. [1]
They are not visible to the user and pass the processed information on to the next layer. [1]

Q14. **[2]**

Model evaluation is the process of using evaluation metrics to understand a model's performance, strengths, weaknesses and suitability for the task. [1]
It gives feedback so that the model can be refined and retested until a desirable accuracy is reached. [1]

Q15. **[2]**

Grayscale image: each pixel has a single intensity value (0 to 255) showing shades of grey; it has one channel. [1]
RGB image: each pixel has three values for red, green and blue, giving colour; it has three channels. [1]

Q16. **[2]**

TF-IDF stands for Term Frequency and Inverse Document Frequency. [1]
Any two applications: document classification, topic modelling, information retrieval system, stop-word filtering. [1]

Q17. **[4]**

(a) Natural Language Processing (NLP): translation and grammar/style analysis require understanding human-language text [2]
(b) Computer Vision (CV): scanning and categorising vehicles from camera feeds requires analysing visual information [2]

Q18. **[4]**

Supervised learning uses labelled data to learn known outputs; example: spam detection. [1]
Unsupervised learning finds hidden patterns in unlabelled data; example: grouping customers by behaviour. [1]
Reinforcement learning learns by trial and error from rewards and penalties; example: a robot learning to walk. [1]
Key difference: supervised learning is guided by correct answers, while reinforcement learning is guided only by rewards and penalties. [1]

Q19. **[4]**

AI is the broad umbrella field in which machines mimic human intelligence. [1]
ML is a subset of AI in which machines learn from data and improve with experience. [1]
DL is a subset of ML that uses multi-layer neural networks trained on vast amounts of data; it is the most advanced form of AI. [1]
Relationship: AI contains ML and ML contains DL (in a Venn diagram, AI is the outer circle, ML lies inside it and DL lies inside ML). [1]

Q20. **[4]**

TP: a spam email is correctly marked as spam. [1]
TN: a legitimate email is correctly delivered to the inbox. [1]
FP: a legitimate email is wrongly sent to the spam folder; the user may miss important mail, which is usually the costlier error for them. [1]
FN: a spam email reaches the inbox as if it were legitimate, which is annoying but usually less costly. [1]

Q21. **[4]**

Stemming chops off affixes to get a stem, which may not be a meaningful word; it is faster. [1]
Lemmatisation returns a meaningful dictionary word (lemma) and takes longer to execute. [1]
Example: for 'studies', stemming gives 'studi' and lemmatisation gives 'study'. [1]
Both processes remove affixes; e.g. 'healed' and 'healing' both reduce to 'heal' under the two methods. [1]

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