CENTRAL BOARD OF SECONDARY EDUCATION

CBSE 2026-27

Artificial Intelligence

Subject Code: 417 | Class X

Solutions

Sample Question Paper – Set 3

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) In the communication cycle, the response given by the receiver to the sender is called:

(a) Encoding (b) Noise (c) Feedback (d) Channel

(ii) Breaking down big goals into smaller parts will make the goal _____.

(a) specific (b) measurable (c) realistic (d) achievable

(iii) Which malware disguises itself as useful software and then destroys data?

(a) Worm (b) Firewall (c) Trojan Horse (d) Anti-virus

(iv) Sanjana opened a small grocery store in her neighbourhood. Despite competition from nearby stores, her business attracted regular customers. Within a year, she expanded her store and later opened four more branches across the city. She now plans to expand to two more cities. Which stage of the career or entrepreneurial process is she currently in?

(a) Grow (b) Survive (c) Enter (d) Retire

(v) A small shop owner sells the same goods as nearby shops and never tries anything new. He is best called:

(a) An entrepreneur (b) A businessman
(c) A wage-employed person (d) A consumer

(vi) Rainwater harvesting mainly helps to:

(a) Increase air pollution (b) Reduce soil fertility
(c) Collect and store rainwater for later use (d) Waste water

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

(i) In the AI Project Cycle, the stage in which you set the goal of your project by stating the problem you wish to solve is:

(a) Deployment (b) Data Exploration (c) Modelling (d) Problem Scoping

(ii) A team gives its large collected dataset a visual representation using graphs, databases, flow charts and maps. Which stage of the AI Project Cycle is it performing?

(a) Problem Scoping (b) Data Acquisition (c) Modelling (d) Data Exploration

(iii) Which statement correctly relates AI, ML and DL?

(a) AI is a subset of Machine Learning.
(b) Machine Learning is a subset of Artificial Intelligence.
(c) Deep Learning is the broadest of the three.
(d) Machine Learning and Deep Learning are unrelated fields.

(iv) TP = 50, FP = 10, FN = 30 and TN = 110. What is the precision?

(a) 0.63 (b) 0.83 (c) 0.50 (d) 0.73

(v) State True or False: Facial recognition and face filters are both applications of Computer Vision.

(vi) Which type of chat bot requires coding and works on bigger databases directly?

(a) Script bot (b) Smart bot (c) Traditional bot (d) Rule-based bot

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

(i) The last stage of the AI Project Cycle is _____.

(ii) In supervised learning, what is the purpose of the testing dataset?

(a) To train the model. (b) To create new features.
(c) To evaluate the model's accuracy. (d) To label the data.

(iii) TP = 40, FP = 20, FN = 10 and TN = 30. What is the recall?

(a) 0.67 (b) 0.57 (c) 0.80 (d) 0.75

(iv) Which evaluation parameter takes into consideration all the correct predictions?

(v) The output of a convolution layer is called a:

(a) word vector (b) feature map (c) byte image (d) confusion matrix

(vi) **Assertion (A):** Stemming always produces a meaningful dictionary word.
Reason (R): Stemming only removes affixes and does not check whether the resulting stem is meaningful.
(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 × 5 = 5 marks) **[5]**

(i) Which of the following represents the correct order of the stages of the AI project cycle?
(a) Data Exploration, Problem Scoping, Modelling, Evaluation, Data Acquisition
(b) Problem Scoping, Data Acquisition, Data Exploration, Modelling, Evaluation
(c) Modelling, Data Acquisition, Evaluation, Problem Scoping, Data Exploration
(d) Data Acquisition, Data Exploration, Problem Scoping, Modelling, Evaluation

(ii) _____ learning works on unlabelled data to find hidden patterns.

(iii) F1 score is the measure of the balance between:
(a) Accuracy and Precision (b) Precision and Recall
(c) Recall and Accuracy (d) Recall and Reality

(iv) Accuracy can be misleading when:
(a) the dataset is balanced (b) the model is trained on labelled data
(c) the dataset is highly imbalanced (d) the testing data is used for evaluation

(v) Which task draws a separate outline for each individual apple in a photo of several apples?
(a) Instance segmentation (b) Image classification
(c) Grayscale conversion (d) Image enhancement

(vi) What are the stemmed and lemmatised forms of the word 'flies'?
(a) Stemmed: fly, Lemmatized: flies (b) Stemmed: fly, Lemmatized: fly
(c) Stemmed: flies, Lemmatized: flies (d) Stemmed: fli, Lemmatized: fly

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

(i) **Assertion (A):** Bioethics is an example of a Value-based Framework for AI.
Reason (R): Bioethics deals with ethical issues related to health, medicine, and biological sciences.
(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) A model predicts whether a student will pass, using Attendance and Study hours as inputs. Attendance and Study hours are called:
(a) Features (b) Labels (c) Instances (d) Models

(iii) **Assertion (A):** The F1 score is a suitable metric when the classes are imbalanced.
Reason (R): Accuracy alone can be misleading on imbalanced data.
(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 grayscale image has how many colour channels?
(a) 1 (b) 0 (c) 3 (d) 4

(v) State True or False: In natural language, a word can have multiple meanings, and the correct meaning fits the statement according to its context.

(vi) A company wants to analyse customer reviews to understand satisfaction levels. Which NLP application is most suitable?

(a) Text classification
(b) Sentiment analysis
(c) Keyword extraction
(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. Write the 7 C's of communication. **[2]**

Q7. Explain self-regulation. Give one example. **[2]**

Q8. What is a worm virus? How is it different from a Trojan Horse? **[2]**

Q9. State two differences between a businessman and an entrepreneur. **[2]**

Q10. Give two examples of green innovations by entrepreneurs mentioned in the NCERT textbook. **[2]**

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

Q11. What do you do in the second and third stages of an AI Project cycle? **[2]**

Q12. Give two differences between supervised and unsupervised learning. **[2]**

Q13. What is the role of hidden layers in a neural network? **[2]**

Q14. What is model evaluation in machine learning, and how does it help improve an AI model? **[2]**

Q15. Differentiate between grayscale and RGB images. **[2]**

Q16. With reference to data processing, expand the term TF-IDF. Also give any two applications of TF-IDF. **[2]**

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

Q17. Consider the following scenarios and identify which AI domain would be most appropriate for each, with justification: **[4]**

(a) An AI based education platform needs to translate to English language and analyze thousands of student essays to provide instant feedback on grammar, content quality and writing style. (2)

(b) An AI based application installed on a busy crossing in a metropolitan city scans all vehicles driving through that crossing during peak traffic hours and categorizes them into four wheelers and two wheelers. (2)

Q18. Explain supervised, unsupervised and reinforcement learning, with one example of each. **[4]**

Q19. Differentiate between Deep Learning, Artificial Intelligence and Machine Learning, and explain how they are related. **[4]**

Q20. Explain the four outcomes of a confusion matrix (TP, TN, FP and FN) using a spam email filter. Which outcome is usually the most harmful to the user, and why? **[4]**

Q21. Differentiate between stemming and lemmatisation. Explain with the help of an example. **[4]**

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