CBSE | DEPARTMENT OF SKILL EDUCATION

ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 417)

MARKING SCHEME FOR CLASS X (SESSION 2026-2027)

Max. Time: 2 Hours **Max. Marks: 50**

General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **21 questions** in two sections – Section A & 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.** There is no negative marking.
   - **iii.** Do as per the instructions given.
   - **iv.** Marks allotted are mentioned against each question/part.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):**
   - **i.** This section contains 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.

SECTION A: OBJECTIVE TYPE QUESTIONS

Q. No.	QUESTION	Source Material (NCERT/PSSCIVE/ CBSE Study Material)	Unit/ Chap. No.	Page no. of source material	Marks
Q. 1	**Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)**				
i	d) Time	NCERT	1	16	**1**
ii	d) ii -> iii -> i	NCERT	2	42	**1**
iii	b) External	NCERT	2	64	**1**
iv	d) .txt	NCERT	3	80	**1**
v	c) Blaming employees for wrong decisions	NCERT	4	103	**1**
vi	a) Responsible Consumption and Production	NCERT	5	117	**1**

Q. 2	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i	d) Pragmatic Analysis	CBSE Study material	6	160	**1**
ii	c) A is true, but R is false	CBSE Study material	5	125	**1**
iii	c) Training and testing AI algorithms	CBSE Study material	1	8	**1**
iv	c) Evaluating a model to determine its performance	CBSE Study material	3	62	**1**
v	a) Classification	CBSE Study material	2	39	**1**
vi	c) False Positive	CBSE Study material	3	73	**1**
Q. 3	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i	b) The bark of the tree was rough and peeling.	CBSE Study material	6	153	**1**
ii	b) Detecting objects in images or videos	CBSE Study material	5	126	**1**
iii	b) Do no harm	CBSE Study material	1	16	**1**
iv	c) Only Statement 1 is correct.	CBSE Study material	1	15	**1**
v	c) Reinforcement Learning	CBSE Study material	2	36	**1**
vi	b) Ratio of total number of correctly classified positive examples and the total number of predicted positive examples.	CBSE Study material	3	77	**1**
Q. 4	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i	c) Visual search and virtual try-on	CBSE Study material	5	124	**1**
ii	d) happy	CBSE Study material	6	167	**1**
iii	b)Testing AI for bias before deployment	CBSE Study material	1	15	**1**

iv	c) 10	CBSE Study material	6	165	**1**
v	c) A is true, but R is false	CBSE Study material	2	42	**1**
vi	a) 0.73	CBSE Study material	3	77	**1**
Q. 5	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**				
i	b) Identify the most relevant words or phrases that represent the main topics of a text	CBSE Study material	6	156	1
ii	c) Real object →Sensing device→ Interpreting Device	CBSE Study material	5	122	**1**
iii	b) It can be used for any unsupervised learning algorithm	CBSE Study material	3	63	**1**
iv	b) 1.5	CBSE Study material	2	48	**1**
v	c) We clean, visualize, and understand the data	CBSE Study material	1	9	**1**
vi	d) 0.04 and 0.96	CBSE Study material	3	66	**1**

Answer any 3 out of the given 5 questions on Employability Skills in 20 – 30 words each (2 x 3 = 6 marks)

SECTION B: SUBJECTIVE TYPE QUESTIONS

Q. No.	**QUESTION**	**Source Material (NCERT/PSSCIVE/ CBSE Study Material)**	**Unit/ ChapNo.**	**Page no. of source material**	**Marks**
6.	Verbal communication includes sounds, words, language, and speech. Type of Verbal Communication are- Interpersonal Communication, Written Communication, Small Group Communication and Public Communication. ½ marks for any each type	NCERT	1	17	**2**
7.	**SMART** is a goal-setting framework that ensures goals are **Specific, Measurable, Achievable, Relevant, and Time-bound**. It helps individuals or teams create clear, realistic objectives with defined outcomes and deadlines. (½ mark for each point)	NCERT	2	63	**2**

8.	• An entrepreneur is someone who takes initiative, shows creativity, and is willing to take risks to start and grow a business. • They are confident, they have patience • Take responsibility for my actions and mistakes. • They work hard on every task. • They think of different ways to solve a problem. • They are creative. • They are good decision makers. • They do not give up when I face a problem. (½ mark for each point mentioned above or any relevant point)	NCERT	4	100	**2**
9.	A Trojan Horse virus disguises itself as a legitimate program to trick users into installing it. Once activated, it can damage files, steal information, or give hackers remote access to the infected computer without the user's knowledge. (1 mark for each point)	NCERT	3	90	**2**
10.	Education for sustainable development helps people learn how to take care of the Earth and use resources wisely. It teaches us to make choices that protect the environment and help everyone live better now and in the future. (1 mark for each point)	NCERT	5	123	**2**
Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)					
11.	Bioethics is an ethical framework used in healthcare and life sciences. It deals with ethical issues related to health, medicine, and biological sciences, ensuring that AI applications in healthcare adhere to ethical standards and considerations. Principles of bioethics: ● Respect for Autonomy. ● Do not harm. ● Ensure maximum benefit for all. ● Give justice. (1 mark for explanation and 1/2 mark for any 2 example)	CBSE Study material	1	16	**2**
12.	Association Rule is an unsupervised learning method that is used to find interesting relationships between variables from the database. For example- Consider a supermarket wherein- Customer A buys bread, butter and milk. Customer B buys rice, bread and butter. Based on the purchase pattern of other customers, we can predict that there is a high probability	CBSE Study material	2	43	**2**

	that any customer x who buys bread will most probably buy butter. (1 mark for explanation and 1 mark for example)				
13.	Anomaly detection helps us find the unexpected things hiding in our data. For example, tracking your heart rate, and finding a sudden spike could be an anomaly, flagging a potential issue. (1 mark for explanation and 1 mark for example)	CBSE Study material	2	26	**2**
14.	It helps you understand its strengths, weaknesses, and suitability for the task at hand. Remember that It's not recommended to use the data we used to build the model to evaluate it. This is because our model will simply remember the whole training set, and will therefore always predict the correct label for any point in the training set. This is known as overfitting. (1 mark for each point)	CBSE Study material	3	64	**2**
15.	**Computer Vision Vs. Image Processing** **Computer Vision**: • Computer vision deals with extracting information from the input images or videos toinfer meaningful information and understanding them to predict the visual input • Computer Vision is a superset of ImageProcessing. • Examples - Object detection, Handwritingrecognition, etc. **Image Processing**: • Image processing is mainly focused on processing the raw input images to enhance them or preparing them to do other tasks • Image Processing is a subset of ComputerVision. • Examples - Rescaling image, Correcting brightness, Changing tones, etc. (½ mark for each point)	CBSE Study material	5	123	**2**
16.	A newspaper company uses an AI model that can automatically sort articles into categories like *Sports*, *Politics*, *Health*, and *Technology*. Identify this NLP application and explain how it helps.The newspaper company is using **text classification**, a type of Natural Language Processing (NLP).It helps by automatically sorting news articles into groups like Sports, Politics, Health, and Technology. This saves time, makes it easier for readers to find what they like, and helps the company manage news better. (1 mark for the correct application, 1 mark for explanation)	CBSE Study material	6	156	**2**
Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)					

17.	a) What ethical concerns should be discussed before installing the AI-powered cameras ? i. The ethical concerns to discuss include **respect for privacy**, ensuring that students' personal space and dignity are protected. ii. The school should also promote **fairness and accountability**, making sure the AI does not wrongly target or misjudge students, and that human oversight is in place for all decisions. Lastly, the system should reflect **transparency and trust**, with clear communication and consent from students and parents. (1 mark for each reason) b)How can the system avoid violating user privacy? Should the AI be allowed to make decisions without human oversight? I. To protect privacy, the system should **collect only necessary information**, **keep it safe**, and **use it only to help keep students safe**. Ii. The AI should **not make decisions on its own** — a teacher or adult should always check and decide what to do. This makes sure the system is fair and trustworthy. (1 mark for each reason)	CBSE Study material	1	15	**4**
18.	Neural networks are loosely modelled after how neurons in the human brain behave. It is divided into multiple layers and each layer is further divided into several blocks called nodes. Each node has its own task to accomplish which is then passed to the next layer. (1mark) ● The first layer of a Neural Network is known as the input layer. The job of an input layer is to acquire data and feed it to the Neural Network. No processing occurs at the input layer. (0.5 marks) ● Next to it, are the hidden layers. Hidden layers are the layers in which the whole processing occurs. Their name essentially means that these layers are hidden and are not visible to the user. Each node of these hidden layers has its own machine learning algorithm which it executes on the data received from the input layer. The hidden layer performs computation by means of weights and biases Information passes from one layer to the other after the value found from this calculation passed through a selected activation function. The process of finding the right output begins with trial and error until the network finally learns. With each try, the weights are adjusted based on the error	CBSE Study material	2	46,47	**4**

	found between the desired output and the network output. There can be multiple hidden layers in a neural network system and their number depends upon the complexity of the function for which the network has been configured. Also, the number of nodes in each layer can vary accordingly. (2 mark) (any 2 relevant points) ● The last hidden layer passes the final processed data to the output layer which then gives it to the user as the final output. (0.5 marks)				
19.	a) We use rule-based approach b) Rule Based Approach refers to the AI modelling where the relationship or patterns in data are defined by the developer. The machine follows the rules or instructions mentioned by the developer, and performs its task accordingly. c) A drawback/feature for this approach is that the learning is static. The machine once trained, does not take into consideration any changes made in the original training dataset. That is, if you try testing the machine on a dataset which is different from the rules and data you fed it at the training stage, the machine will fail and will not learn from its mistake. d) We can improve the chatbot by switching to a learning-based model, which can learn from new questions over time. (1 mark for each point)	CBSE Study material	2	29,30	4
20.	A sentiment analyzer is used to classify responses as positive(1) or negative(0). Out of 500 responses. - True Positives(TP): 150 responses were correctly classified as positive. - False Positives(FP): 100 responses were incorrectly classified as positive. - True Negatives(TN): 200 responses were correctly classified as negative. - False Negatives(FN): 50 responses were incorrectly classified as negative. Calculate accuracy, precision, recall, and F1-score. $$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$ $$= \frac{150 + 200}{500} = \frac{350}{500} = 0.70$$ **Accuracy** = 70%	CBSE Study material	3	76,77,78 ,79	**4**

$$\text{Precision} = \frac{TP}{TP + FP}$$

$$= \frac{150}{150 + 100} = \frac{150}{250} = 0.60$$

Precision=0.60

$$\text{Recall} = \frac{TP}{TP + FN}$$

$$= \frac{150}{150 + 50} = \frac{150}{200} = 0.75$$

Recall=0.75

$$\text{F1-score} = \frac{2 \times (\text{Precision} \times \text{Recall})}{\text{Precision} + \text{Recall}}$$

$$= \frac{2 \times (0.60 \times 0.75)}{0.60 + 0.75} = \frac{2 \times 0.45}{1.35} = \frac{0.90}{1.35} \approx 0.667$$

F1Score=0.667

(½ mark for formula; ½ mark for the answer)

21. a) Find out the frequency of a word in one document. Term frequency is the frequency of a word in one document. Term frequency can easily be found in the document vector table as in that table we mention the frequency of each word of the vocabulary in each document.

	the	cat	sat	on	mat	dog	is	barking	both	are	good	pets
Doc1	2	1	1	1	1	0	0	0	0	0	0	0
Doc2	1	0	0	0	0	1	1	1	0	0	0	0
Doc3	0	0	0	0	0	0	0	0	1	1	1	1

(1 mark for the table)

b) Document Frequency is the number of documents in which the word occurs irrespective of how many times it has occurred in those documents.

the	cat	sat	on	mat	dog	is	barking	both	are	good	pets
2	1	1	1	1	1	1	1	1	1	1	1

(1 mark for the table)

c) In inverse document frequency, we need to put the document frequency in the denominator while the total number of documents is the numerator.

the	cat	sat	on	mat	dog	is	barking	both	are	good	pets
3/ 2	3/1	3/1	3/1	3/1	3/1	3/1	3/1	3/1	3/1	3/1	3/1

CBSE Study material | 6 | 173,174 | **4**

	(1 mark for the table) d) The formula of TFIDF for any word W is: TFIDF(W) = TF(W) * log(IDF(W)) Here, log is to the base of 10. (1 mark for the formula)				