

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2026 (2nd Board Examination)
SUBJECT NAME : Artificial Intelligence
(Q.P. CODE / Set No. 417/104)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In Class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.
4	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark (✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “Extra Question” .
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

11	A full scale of marks _____ (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	Ensure that you do not make the following common types of errors committed by the Examiner in the past :- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the “Guidelines for Spot Evaluation” before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.
19	If a candidate attempts both alternatives/options in a question where only one option/alternative is required to be attempted, the Evaluator shall award marks in both the options. The system will take the higher of two scores and disregard the other response.
20	In a question having two options/alternatives, if a candidate has attempted only one, then the evaluator shall mark “NA” (Not attempted) against the option that has not been attempted by the candidate.

MARKING SCHEME
ARTIFICIAL INTELLIGENCE (Subject Code-417)
(PAPER CODE : 104) (M1040417)

Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Source Material	Unit/Ch. No.	Page No.	Marks
	SECTION – A Objective Type Questions				
1.	Answer any 4 out of the given 6 questions on Employability Skills :				4x1=4
(i)	(C) Set a SMART goal.				1
(ii)	(C) A customer is asking a question and the cashier responding.				1
(iii)	(C) Increase in use of fuel for making tea.				1
(iv)	(D) Google Android				1
(v)	(D) Patient				1
(vi)	(C) 17				1
2.	Answer any 5 out of the given 6 questions :				5x1=5
(i)	Analyse how Computer Vision technology has revolutionized the automotive industry, particularly in autonomous vehicles. What is the primary function it serves ? (A) Managing fuel efficiency and engine performance (B) Controlling audio and entertainment systems (C) Identifying objects, navigation routes and environment monitoring for safe autonomous driving (D) Handling vehicle maintenance scheduling Answer : (C) Identifying objects, navigation routes and environment monitoring for safe autonomous driving	Facilitator Handbook	5	124	1
(ii)	You are developing a chatbot for a university admission system. The bot should understand queries like “What are the admission requirements ?” and “When is the deadline ?” Which NLP stages would be most critical for this application ? (A) Only Lexical Analysis (B) Lexical and Syntactic Analysis (C) All stages from Lexical to Pragmatic Analysis (D) Only Semantic Analysis Answer : (C) All stages from Lexical to Pragmatic Analysis	Facilitator Handbook	6	158 - 160	1
(iii)	Which of the following is NOT a principle of bioethics ? (A) Respect for Autonomy (B) Do not harm any one (C) Ensure maximum benefit for all (D) Maximize profit Answer : (D) Maximize profit	Facilitator Handbook	1	16	1

(iv)	A spam email detection system correctly identifies an emails as “Not Spam” when it actually is not spam. This represents : (A) True Positive (TP) (B) True Negative (TN) (C) False Positive (FP) (D) False Negative (FN) Answer : (B) True Negative (TN)	Facilitator Handbook	3	72 - 73	1
(v)	Artificial Neural Networks are inspired by : (A) Computer circuits (B) Mathematical equations (C) Human brain and nervous system (D) Internet networks Answer : (C) Human brain and nervous system	Facilitator Handbook	2	45	1
(vi)	Assertion (A) : Frameworks serve as a common language for communication and collaboration. Reason (R) : Frameworks do not facilitate sharing of best practices. (A) Both (A) and (R) are true and (R) is the correct explanation of (A). (B) Both (A) and (R) are true, but (R) is not the correct explanation of A. (C) (A) is true but (R) is false. (D) (A) is false but (R) is true. Answer : (C) (A) is true but (R) is false.	Facilitator Handbook	1	12	1
3.	Answer any 5 out of the given 6 questions :				5x1=5
(i)	Which of the following best describes overfitting in the context of train-test split ? (A) The model performs well on both training and test data (B) The model performs well on training data but poorly on test data (C) The model performs poorly on training and test data (D) The model performs poorly on training data but well on test data Answer : (B) The model performs well on training data but poorly on test data	Facilitator Handbook	3	64	1
(ii)	In a 1280×1024 monitor resolution, what does this specification indicate ? (A) The monitor can display 1280 colours with 1024 brightness levels (B) There are 1280 pixels horizontally and 1024 pixels vertically (C) The monitor weighs 1280 grams and is 1024 mm wide (D) The refresh rate is 1280 Hz with 1024 frames per second Answer : (B) There are 1280 pixels horizontally and 1024 pixels vertically	Facilitator Handbook	5	128	1

(iii)	In unsupervised learning, the machine's primary task is to : (A) Predict specific outputs (B) Identify patterns and relationship in unlabelled data (C) Classify data into predefined categories (D) Learn from rewards only Answer : (B) Identify patterns and relationship in unlabelled data	Facilitator Handbook	2	34	1
(iv)	Surveillance system using Computer Vision can : (A) Translate spoken languages (B) Detect suspicious activities and track individuals (C) Analyze text documents (D) Process financial transactions Answer : (B) Detect suspicious activities and track individuals	Facilitator Handbook	1	11	1
(v)	Assertion (A) : Sentiment analysis can help business improve customer service. Reason (R) : It automatically detects emotions when customers interact with products or services. (A) Both (A) and (R) are true and (R) is the correct explanation of (A). (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A). (C) (A) is true but (R) is false. (D) (A) is false but (R) is true. Answer : (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).	Facilitator Handbook	6	156	1
(vi)	A music streaming service groups songs by tempo and intensity to understand user preferences. This is an example of : (A) Supervised learning - Classification (B) Unsupervised learning - Clustering (C) Reinforcement learning (D) Supervised learning - Regression Answer : (B) Unsupervised learning - Clustering	Facilitator Handbook	2	42	1
4.	Answer any 5 out of the given 6 question :				5x1=5
(i)	Recall is a classification metrics that measures : (A) How many False positives are correctly identified by the model. (B) How many actual positive cases were correctly identified by the model. (C) How many negative cases were correctly identified by the model. (D) The overall accuracy of the model. Answer : (B) How many actual positive cases were correctly identified by the model.	Facilitator Handbook	3	78	1

(ii)	In agricultural monitoring using Computer Vision, drones with cameras are used to : (A) Communicate with farmers (B) Translate farming manuals (C) Capture aerial images for crop health assessment (D) Calculate crop prices Answer : (C) Capture aerial images for crop health assessment	Facilitator Handbook	1	10	1
(iii)	A company wants to detect manufacturing defects where examples of both normal and defective products are available. They should use : (A) Unsupervised learning (B) Reinforcement learning (C) Association rules (D) Supervised learning Answer : (D) Supervised learning	Facilitator Handbook	2	32-33	1
(iv)	State True or False With respect to Computer Vision, the Classification + Localisation task can only be used for single objects. Answer : True	Facilitator Handbook	5	126	1
(v)	What is the primary purpose of train - test split in model evaluation ? (A) To increase the size of the dataset (B) To reduce computational complexity (C) To estimate the performance of the machine learning model on new data (D) To improve the accuracy of the training process Answer : (C) To estimate the performance of the machine learning model on new data	Facilitator Handbook	3	64	1
(vi)	With reference to text normalization, which of the following is NOT an example of a Stop Word ? (A) into (B) as (C) \$ (D) healed Answer : (D) healed	Facilitator Handbook	6	168	1
5.	Answer any 5 out of the given 6 questions :				5x1=5
(i)	The deployment stage of the AI Project Cycle is crucial for : (A) Collecting initial data (B) Training the model (C) Ensuring successful integration in real - world environment (D) Exploring data patterns Answer : (C) Ensuring successful integration in real - world environment	Facilitator Handbook	1	8-9	1
(ii)	The sentence “hot ice cream” would be rejected at which stage of NLP processing ? (A) Lexical Analysis (B) Syntactic Analysis (C) Semantic Analysis (D) Discourse Integration Answer : (C) Semantic Analysis	Facilitator Handbook	6	159	1

(iii)	Assertion (A) : Computer Vision enables AI to see, observe and make sense of visual data like images and videos. Reason (R) : Computer Vision works independently without requiring artificial intelligence algorithms. (A) Both (A) and (R) are true and (R) is the correct explanation of (A). (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A). (C) (A) is true but (R) is false. (D) (A) is false but (R) is true. Answer : (C) (A) is true but (R) is false.	Facilitator Handbook	5	121 - 123	1
(iv)	This ethical concern refers to an honest explanation how the chosen evaluation metrics work and produce results without keeping any information hidden. Name this ethical concern that should be kept in mind while evaluating an AI model. (A) Bias (B) Transparency (C) Accountability (D) Accuracy Answer : (B) Transparency	Facilitator Handbook	3	81	1
(v)	Which NLP application would be most useful for a hearing - impaired person watching a live news broadcast ? (A) Language translation (B) Voice assistants (C) Autogenerated captions (D) Sentiment analysis Answer : (C) Autogenerated captions	Facilitator Handbook	6	155	1
(vi)	Which of the following best describes model evaluation in artificial intelligence ? (A) The process of creating new dataset for training (B) The process of using different evaluation metrics to understand a machine learning model's performance (C) The process of selecting algorithms for model building (D) The process of data preprocessing and cleaning Answer : (B) The process of using different evaluation metrics to understand a machine learning model's performance	Facilitator Handbook	3	62	1
	For questions 1-12 - (1 mark for each correct answer)				

	Section - B Subjective Type Questions				
6.	Answer any 3 out of the given 5 questions on Employability Skills in 20-30 words each.				3x2=6
	(a) Linguistic barriers - Use simple language OR (b) Cultural barriers - Be respectful of cultural differences OR (c) Physical barriers - Communicate in person when possible OR (d) Interpersonal barriers - Use visuals to aid communication (1 mark for correct barrier and 1 mark for explanation)				2
7.	No, this is not advisable. If we leave the device plugged in for long time, it can overheat the battery. This reduces the battery life. (1 mark for correct Yes/No) (1 mark for justification)				2
8.	Misconception 1 : Every business ideas needs to be unique. Misconception 2 : Need lots of money to start business. Misconception 3 : Only a person having big business is an entrepreneur. Misconception 4 : An entrepreneur is born not made. (1 mark for each correct answer)				2
9.	(a) Organize - Plan daily activities and make timetable (b) Prioritize - Rank tasks in order of importance (c) Control - Avoid time wasters and focus on important things (d) Track - Monitor how time is spent to identify improvements (½ mark for each correct step)				2
10.	(a) Reuse paper, glass, plastic, water. (b) Take cloth bags for shopping. (c) Donate unused items like clothes, books, furniture. (d) Buy and eat seasonal fruits and vegetables from local growers. (e) Repair leaking pipes and taps to avoid wastage of water. (f) Sort and treat garbage before disposing. (½ mark for each correct way) (any four)				2

	Answer any 4 out of the given 6 questions in 20 – 30 words each.				4x2=8
11.	Differentiate between Statistical Data and Computer Vision domains of AI with one example each. Answer : Statistical Data : Related to data systems and processes where the system collects numerous data, maintains datasets and derives meaning from them. Works with numerical/statistical information. Example : Price Comparison Websites Computer Vision : Depicts the capability of a machine to get and analyze visual information and make decisions about it. Works with images, videos and visual data Example : Facial Recognition systems, Self-driving cars (1 mark for correct difference (any point) ½ mark each for correct example)	Facilitator Handbook	1	10 - 11	2
12.	Give any two characteristics of Artificial Neural Networks. Answer : • These are modelled on the human brain and nervous system. • They are able to automatically extract features without input from the programmer. • It is useful for solving problems when data set is very large. (1 mark for each correct characteristic)	Facilitator Handbook	2	45	2
13.	With reference to computer vision, define the following terms : (a) Pixel (b) Instance Segmentation Answer : (a) Pixel : It means a picture element. Every photograph in digital form is made up of pixels. They are the smallest unit of information that make up a picture. Usually round or square, they are typically arranged in a 2-dimensional grid. (b) Instance Segmentation : It is the process of detecting instances of the object, giving them a category and then giving each pixel a label based on that. It takes an image as input and gives multiple segments as output. (1 mark for each correct definition)	Facilitator Handbook	5	127-128	2

14.	Provide one real - world application each of Supervised Learning and Unsupervised Learning. Answer : Supervised Learning Application : Email spam detection - The system is trained on labelled emails (spam/not spam) to classify new incoming emails. Unsupervised Learning Application : Customer segmentation in supermarkets - Analyzing customer purchase patterns to group customers who buy groceries regularly without pre - labelled categories. (1 mark for each correct application)	Facilitator Handbook	2	32 - 36	2
15.	Define Accuracy. Also give one example to explain why high accuracy does not always mean a model is performing well in real - world situations. Answer : Accuracy is an evaluation metric that measures the total number of predictions a model gets right. High accuracy can hide important errors, especially in cases like medical diagnosis. A model might miss rare but serious cases, so other metrics like precision or recall may give a better picture of performance. (1 mark for each correct part)	Facilitator Handbook	3	65 - 66	2
16.	With reference to NLP, list the first four steps involved in text normalization. Answer : The first four steps involved in text normalization are as follows : (a) Sentence Segmentation (b) Tokenization (c) Remove stop words, special characters, numbers (d) Converting text to a common case (½ mark for each correct step)	Facilitator Handbook	6	165	2

	Answer any 3 out of the given 5 question in 50 - 80 words each.				4x2=8
17.	(a) Differentiate between Classification Model and Regression model. (b) Study the following real - world applications and identify whether each represents a Classification Model or a Regression Model. (i) Predicting a patient's blood pressure reading will be 120/80 mmHg based on age, weight and lifestyle factors. (ii) Forecasting that 2,847 units of a product will be sold next month based on past sales data and market trends. (iii) Determining if a patient has "diabetes" or "no diabetes" based on glucose levels and other medical parameters. (iv) Predicting that a company's share price will be ₹ 1,250.75 tomorrow based on market indicators and company performance. Answer : (a) Classification Model • Predicts discrete categories/classes. • Output is categorical (Yes/No, spam/not spam). • Work with discrete datasets. Regression Model • Predicts continuous numerical values • Output is numerical (price, temperature) • Works with continuous datasets (1 mark for each correct point of difference) (Any two) (b) (i) Regression Model (ii) Regression Model (iii) Classification Model (iv) Regression Model (½ mark for each correct part)	Facilitator Handbook	2	39 - 41	4

18.	A smart city project wants to implement an integrated AI system. For each of the following requirements, identify the most appropriate AI domain and justify your choice : (a) Analyzing traffic camera footage to count vehicles and detect traffic violations automatically. (b) Processing citizen complaints written in local languages to categorize them as “water supply,” “electricity,” or “waste management” issues. Answer : (a) Computer Vision : To process visual data from cameras to identify and count objects (vehicles) and detect behaviours (violations) requires image/video analysis capabilities. (b) Natural Language Processing(NLP) : To understand text written in natural languages and classifying them into categories requires text processing and language understanding capabilities. (1 mark for each correct identification of AI domain and 1 mark each for justification.)	Facilitator Handbook	1	9 - 11	4																										
19.	An AI model has been developed to predict whether electric vehicle batteries need replacement based on performance data. The model was tested on a dataset of 700 vehicles and the resulting confusion matrix is as follows : <table border="1"><tr><th colspan="2" rowspan="2">Confusion Matrix</th><th colspan="2">Reality</th></tr><tr><th>Yes</th><th>No</th></tr><tr><th rowspan="2">Prediction</th><th>Yes</th><td>590</td><td>20</td></tr><tr><th>No</th><td>10</td><td>80</td></tr></table> The above Confusion Matrix can also be represented as follows : <table><tr><td colspan="2" rowspan="2"></td><th colspan="2">Predicted Values</th></tr><tr><th>1</th><th>0</th></tr><tr><th rowspan="2">Actual Values</th><th>1</th><td>590</td><td>10</td></tr><tr><th>0</th><td>20</td><td>80</td></tr></table> (a) How many total cases are False Positives in the above scenario ? (b) Calculate Precision. Recall and F1 Score. Answer : (a) False Positives (FP) : 20 (1 mark for correct answer) (b) Given : • True Positives (TP) : 590 • False Positives (FP) : 20 • False Negatives (FN) : 10 • True Negatives (TN) : 80 • Total samples : 700	Confusion Matrix		Reality		Yes	No	Prediction	Yes	590	20	No	10	80			Predicted Values		1	0	Actual Values	1	590	10	0	20	80	Facilitator Handbook	3	68 - 79	4
Confusion Matrix				Reality																											
		Yes	No																												
Prediction	Yes	590	20																												
	No	10	80																												
		Predicted Values																													
		1	0																												
Actual Values	1	590	10																												
	0	20	80																												

	Calculations : Precision = $TP / (TP + FP)$ $= 590 / (590 + 20) = 590 / 610 = 0.967$ Recall = $TP / (TP + FN)$ $= 590 / (590 + 10) = 590 / 600 = 0.983$ F1 Score = $2 \times (Precision \times Recall) / (Precision + Recall)$ $= 2 \times (0.967 \times 0.983) / (0.967 + 0.983)$ $= 0.974$ (1 mark each for precision, recall and F1) Note : The mathematical calculations can be ignored				
20.	(a) Explain Reinforcement Learning with an example. (b) A drawback of Rule Based Approach is that learning is static. Explain the given statement. Answer : (a) Reinforcement Learning : Agent learns through trial-and-error using rewards and penalties Example : AI playing chess - gets positive reward for winning moves, negative for losing moves. (1 mark for correct explanation, 1 mark for correct example) (b) Learning in rule based approach is static because the machine once trained, does not take into consideration any changes made in the original training data set. Hence, if the machine is tested on a dataset that is different from the rules and data that were fed, the machine will fail. The rule based model does what it has been taught once. (2 mark for correct answer)	Facilitator Handbook	2	34-37 30	4
21.	Consider the following documents : Document 1 : AI helps humans daily. Document 2 : Humans use AI technology. Implement all the four steps of Bag of Words (BoW) model to create a document vector table. Answer : Given Documents : - Document 1 : AI helps humans daily - Document 2 : Humans use AI technology Step 1 : Text Processing (Normalization) After removing stop words and converting to lowercase : - Document 1 : [ai, helps, humans, daily] - Document 2 : [humans, use, ai, technology]	Facilitator Handbook	6	169-171	4

	Step 2 : Create Dictionary(Vocabulary) unique words : ai, helps, humans, daily, use, technology Step 3 : Create Document Vectors Count frequency of each vocabulary word in each document. Step 4 : Final Document Vector Table <table> <tr> <th>ai</th><th>helps</th><th>Humans</th><th>Daily</th><th>Use</th><th>technology</th></tr> <tr> <td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr> <td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td></tr> </table> (1 mark for each correct step)	ai	helps	Humans	Daily	Use	technology	1	1	1	1	0	0	1	0	1	0	1	1				
ai	helps	Humans	Daily	Use	technology																		
1	1	1	1	0	0																		
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