

Marking Scheme Strictly Confidential (For Internal and Restricted use only) SECONDARY SCHOOL SUPPLEMENTARY EXAMINATION, 2025 SUBJECT NAME : ARTIFICIAL INTELLIGENCE (SUB. CODE-417)	
<u>General Instructions: -</u>	
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.

Set 4

MARKING SCHEME ARTIFICIAL INTELLIGENCE (SUB. CODE-417)

1. Answer any 4 out of the given 6 questions on Employability Skills : 4×1=4
 - (i) (D) Time management 1
 - (ii) (C) Starting a business requires a large amount of initial capital 1
 - (iii) (C) .jpg 1
 - (iv) (C) Written letters 1
 - (v) (B) Specific, Measurable, Achievable, Realistic, Time-bound 1
 - (vi) (A) Both A and R are true, and R is the correct explanation of A. 1
2. Answer any 5 out of the given 6 questions : 5×1=5
 - (i) (B) Artificial Intelligence (AI) 1
 - (ii) (D) Data Science 1
 - (iii) True 1
 - (iv) (D) Shar 1
 - (v) (A) Ability that is related to how a person uses his limbs in a skilled manner. 1
 - (vi) (A) SQL databases 1
3. Answer any 5 out of the given 6 questions : 5×1=5
 - (i) (C) Data Acquisition 1
 - (ii) (B) Accuracy 1
 - (iii) (B) Self-driving cars 1
 - (iv) (D) Classification + Localisation 1
 - (v) (D) When a defective product is mistakenly identified as non-defective. 1
 - (vi) (C) the 1
4. Answer any 5 out of the given 6 questions : 5×1=5
 - (i) (B) Stop-words 1

- (ii) (B) Regression 1
- (iii) Overfitting 1
- (iv) (B) Collecting and Pre-processing Data 1
- (v) (B) It is a model training matrix 1
- (vi) Yahoo, Bing, Ask, AOL etc. 1
1 mark for naming any **two** search engines. (listed above or any other valid search engine names)

5. Answer any **5** out of the given **6** questions : 5×1=5

- (i) (C) Natural Language Processing (NLP) 1
- (ii) (C) It receives and passes the raw input data to the hidden layers. 1
- (iii) (B) Computer Vision 1
- (iv) (C) Bias can result in unfair or discriminatory outcomes 1
- (v) (D) A person without the disease tests negative for the disease. 1
- (vi) (D) A is false, but R is true. 1

Answer any 3 out of the given 5 questions on Employability Skills 3×2=6 in 20-30 words each.

6. Sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. 2

Problems related to sustainable development : (any **two**)

- (1) Food
- (2) Water
- (3) Fuel

1 mark for correct definition

½ mark each for any two correct problems

7. The various elements of a communication cycle are : 2

Sender : the person beginning the communication.

Message : the information that the sender wants to convey.

Channel : the means by which the information is sent.

Receiver : the person to whom the message is sent.

Feedback : the receiver's acknowledgement and response to the message.

2 marks for any two elements given above.

8. Wage employed people are people who work for a person or an organization and get paid for that work. Self-employed people are those who start businesses to satisfy the needs of people. 2

2 marks for the correct difference.

9. A healthy lifestyle is essential for students. Stress is generally lower in people who maintain a healthy routine. Doing yoga, meditation and deep breathing exercises help in proper blood circulation and relaxes the body. Even taking a walk or playing in the park will help you get a lot of fresh oxygen, which will help you become more active. **2**

2 marks for the correct answer.

10. (A) Firewall monitor the data coming in and out of a computer and prevent and viruses from entering. **2**
(B) Worms are viruses that replicate themselves and spread to all files once they attack a computer.
This makes it very difficult to remove them.

2 marks for the correct definitions.

Answer any 4 out of the given 6 questions in 20-30 words each. $4 \times 2 = 8$

11. Kineasthetic Intelligence : Ability that is related to how a person uses his limbs in a skilled manner. **2**

Spatial Visual Intelligence : it is defined as the ability to perceive the visual world and the relationship of one object to another.

2 marks for the valid point of difference.

12.

Script-bot	Smart-bot
Script bots are easy to make	Smart-bots are flexible and powerful
Script bots work around a script which is programmed in them	Smart bots work on bigger databases and other resources directly
Mostly they are free and are easy to integrate to a messaging platform	Smart bots learn with more data
No or little language processing skills	Coding is required to take this up on board
Limited functionality	Wide functionality

2

2 marks for the valid point of difference.

13. **Data Acquisition** **2**

- It is about acquiring data about project
- Second stage of AI project cycle
- Data should be acquired from reliable sources

Data Exploration

- To analyse the data acquired
- Data is visualised in some user friendly format

→ Get the sense of trends in the data and then define strategy for which the model can be used

(Any two points, 1 mark each for any two correct point of difference)

14. Online sources :

2

- Open sourced government portals
- Reliable websites
- World organisations' open sourced statistical websites

Offline sources :

- Sensors
- Surveys
- Face to face interviews
- Observations in real time

½ mark each for any two correct online sources and two offline sources

15.

Confusion Matrix		Reality	
		Yes	No
Prediction	Yes	200	35
	No	55	50

2

½ mark each for correct mapping.

16. Single objects :

2

- classification
- classification + localization

Multiple objects :

- Object Detection
- Instance segmentation

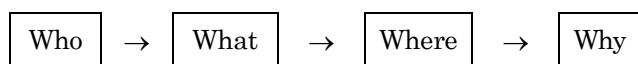
(½ mark for each correct task)

Answer any **3** out of the given **5** questions in **50-80** words each.

3×4=12

17. The 4Ws Problem Canvas helps in identifying key elements related to the problem. The four blocks are :

4



Who – This block helps in analyzing the people affected directly or indirectly due to it.

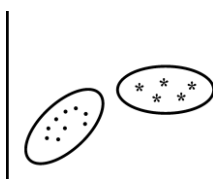
What – This block is used to determine the nature of the problem. You gather evidence to prove that the problem exists.

Where – This block focusses on context/situation/location of the problem

Why – Think about the benefits which the stakeholders would get from the solution and how it will benefit them as well as the society.

(1 mark for correctly explaining each block)

18. Clustering – refers to unsupervised learning algorithm which can cluster the unknown data according to the patterns or trends identified out of it. The patterns may or may not be known to the developer. 4



Dimensionality Reduction – Sometimes its required to reduce the dimension but as we reduce the dimension of an entity, the information which it contains starts getting distorted. To reduce the dimensions and still be able to make sense out of the data, Dimensionality reduction is used.

(2 marks for each correct explanation)

19. Document 1 : CV is an upcoming field. 4

Document 2 : Image Feature is an important part of CV.

1. Text Normalisation : Collect data and pre-process it. The two documents have one sentence each. After text normalisation, the text becomes :

Document 1 : [CV, is, an, upcoming, field]

Document 2 : [Image, Feature, is, an, important, part, of, CV]

Note that no tokens have been removed in the stop-words removal step. It is because we have very little data and since the frequency of all the words is almost the same, no word can be said to have lesser value than the other.

2. Create Dictionary : Make a list of all the unique words occurring in the corpus. (Vocabulary) :

CV is an upcoming field

Image Feature important part of

3. Create document vectors : For each document in the corpus, find out how many times the word from the unique list of words has occurred.
4. Create document vectors for all the documents.

	CV	is	an	upcoming	field	image	feature	important	part	of
Document 1	1	1	1	1	1	0	0	0	0	0
Document 2	1	1	1	0	0	1	1	1	1	1

1 mark for each correct step

20. A. Recommendation Websites : It fall under Data Science due to their heavy reliance on data analysis and machine learning techniques to personalize recommendations based on user data. 4
- B. Voice-based Virtual Assistants : It fall under NLP because their functionality revolves around understanding and generating human language, leveraging various NLP techniques to interpret and respond to user commands and queries.
- C. Spam Filters : NLP algorithms classify emails as spam or legitimate by analyzing text content, identifying patterns, and making decisions based on language features.
- D. Airline Route Planning : Data science methods analyse historical flight data, passenger preferences, and operational constraints to optimize airline route planning for efficiency and cost-effectiveness.

1 mark for each correct answer.

21. A sentiment analysis model was built to classify movie reviews as either 'Positive' or 'Negative'. The model was tested on a dataset of 500 reviews, resulting in the following confusion matrix : 4

Confusion Matrix		Reality	
		Yes	No
Predicted	Yes	300	40
	No	60	100

(A) From the confusion matrix :

True Positive (TP) = 300

So, there are 300 cases that are True Positive.

(B) TP = 300, TN = 100, FP = 40, FN = 60

Precision = $TP / (TP + FP)$

Precision = $300 / (300 + 40) = 300 / 340 = 0.882$

Recall = $TP / (TP + FN)$

Recall = $300 / (300 + 60) = 300 / 360 = 0.833$

F1 = $2 * (Precision * Recall) / (Precision + Recall)$

$$F1 = \frac{2 \times (P \times R)}{(P + R)} = \frac{2 \times (0.882 \times 0.833)}{(0.882 + 0.833)} = \frac{1.469}{1.715} = 0.8568$$

1 mark for part (A) and 1 mark each for part (B) calculation of precision, recall and F1 score.

Note : The mathematical calculations can be ignored.
