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ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 417)
MODEL ANSWER SHEET CLASS X (SESSION 2024-2025)

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.	Marks
Q. 1	**Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)**	
i.	a) leadership and time management	1
ii.	(c) Trojan hourse	1
iii.	(a) Both A and R are true, and R is the correct explanation of A.	1
iv.	b) To adjust strategies and improve efficiency	1
v.	(a) Language barrier	1
vi.	(d) waste reduction	1
Q. 2	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**	
i.	(a) Both A and R are correct and R is the correct explanation of A	1
ii.	b). Improving diagnostic accuracy	1
iii.	(a) Both A and R are correct and R is the correct explanation of A	1
iv.	c). Design and Development	1
v.	d. All of the above	1
vi.	(c) Stop word	1
Q. 3	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**	
i.	a) Human intelligence can feel emotions; AI cannot.	1
ii.	Training Data	1
iii.	b). To prepare data for analysis by removing inaccuracies and inconsistencies	1

iv.	a) Pixel		1
v.	b). Tokenization		1
vi.	b) The model incorrectly labels many non-spam emails as spam.		1
Q. 4	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**		
i.	d) all of these		1
ii.	**(d) Statement2 is correct but Statement1 is incorrect** ● **Statement1** is incorrect because, in AI, a high accuracy model is not always preferred. The type of data and the context are critical. For instance, in cases with class imbalance (like fraud detection), a high accuracy model might just be capturing the majority class, missing critical insights. ● **Statement2** is correct, as accuracy alone can indeed be misleading. For example, in an imbalanced dataset where one class dominates, a model that predicts only the majority class will have high accuracy but poor real-world utility.		1
iii.	The correct answer is: **(a) Testing data is used to train the model to learn the relationships between weather, soil, and crop health.** ● This statement is incorrect because *testing data* is not used for training the model. Instead, *training data* is used to help the model learn relationships and patterns, while *testing data* is set aside to evaluate the model's performance after training.		1
iv.	**Answer:** RGB		1
v.	**(b) Speech Recognition** ● Speech Recognition is the NLP feature that allows virtual assistants like Siri and Alexa to understand and process spoken commands by converting spoken language into text.		1
vi.	**Answer:** Cross-validation		1
Q. 5	**Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**		
ii.	**Answer:** Confusion Matrix		1
iii.	(b) Histogram		1
iv.	(b) Speech Recognition		1
v.	(b) Natural Language Processing (NLP)		1
vi.	(c) Medical diagnosis		1

SECTION B: SUBJECTIVE TYPE QUESTIONS

Q.No.	QUESTION	Marks
Q. 6	**Answer:**Feedback is the receiver's response to a message, which helps the sender know whether the message was understood correctly. It is important because it ensures	**2**

	effective communication by allowing for adjustments if the message was not clearly understood.	
Q. 7	**Answer:** Setting SMART goals—Specific, Measurable, Achievable, Relevant, and Time-bound—helps individuals stay focused, organize their time effectively, and achieve their objectives efficiently. It provides a clear roadmap and motivates one to stay on track.	**2**
Q. 8	**Answer**: The cause may be **malware or adware** infecting her computer. Aisha should run an **antivirus scan** to detect and remove any malicious software to restore her computer's performance.	
Q. 9	**Answer**: Key characteristics of an entrepreneur include **creativity**, **risk-taking**, **resilience**, and **leadership**, which enable them to identify opportunities and navigate challenges in business	**2**
Q 10	. **Answer**: Renewable energy sources, such as solar, wind, and hydroelectric power, provide sustainable alternatives to fossil fuels. They help reduce greenhouse gas emissions, decrease reliance on finite resources, and contribute to energy security.	**2**

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Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)		
Q. 11	**Answer**: AI chatbots provide 24/7 customer support, reduce response time for queries, and free up human agents to handle more complex issues, improving overall service efficiency.	(2 marks for any correct explanation)
Q. 12	**Answer**: Model evaluation is essential to determine how well the AI model performs on unseen data, ensuring its effectiveness in real-world scenarios. Metrics they could use include **accuracy**, **precision**, **recall**, and **F1- score**.	(2 marks for any correct explanation
Q. 13	**Answer**: Supervised learning involves training a model on labeled data, where the input-output pairs are known, to make predictions. In contrast, unsupervised learning deals with unlabeled data, where the model identifies patterns and structures without predefined labels.	2 marks for any correct explanation
Q. 14	☛ **Facial Recognition**: Used in security systems, smartphones, and social media platforms to identify and verify individuals based on their facial features. ☛ **Autonomous Vehicles**: Enables self-driving cars to detect obstacles, recognize traffic signs, and navigate roads safely. ☛ **Medical Imaging**: Assists in analyzing medical images (such as X-rays, MRIs, and CT scans) to detect diseases and anomalies, improving diagnosis and treatment. ☛ **Object Detection**: Used in retail for inventory management, where cameras can identify products on shelves and track stock levels. ☛ **Surveillance Systems**: Monitors public and private spaces for security purposes, detecting unusual activities or identifying individuals in real-time. ☛ **Image Search Engines**: Allows users to search for similar images by uploading a photo, which the system analyzes to find visually similar content online. ☛ **Gesture Recognition**: Used in gaming and interactive applications to interpret user movements and gestures, enhancing user engagement.	(1marks each for CORRECT ANY TWO APPLICATION)

Q. 15	**Answer**: Stop words are common words (like "is," "the," "and") that carry little meaning in analysis and are often removed from text data to reduce noise and improve the efficiency and accuracy of NLP algorithms.	(2 marks for any correct explanation)
Q. 16		2

CONFUSION MATRIX	Predicted Spam	Predicted Not Spam
Actual Spam	40 (TP)	20 (FN)
Actual Not Spam	10 (FP)	30 (TN)

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

Q. 17	**Answer**:
	● a) Recommendation systems utilize machine learning algorithms to analyze user data, such as browsing history and purchase behavior, to identify patterns and preferences. They then generate personalized product suggestions that enhance the shopping experience.
	● b) Two advantages include:
	  o For consumers, personalized recommendations help discover products they might not have found otherwise, improving their shopping experience.
	  o For businesses, AI-driven recommendations can increase sales and customer retention by providing targeted marketing and enhancing customer satisfaction.
		2+2

Q. 18	**Answer**: Data preprocessing is a crucial step in the AI project cycle because it prepares the raw data for analysis, ensuring that it is clean, consistent, and usable. Poorly prepared data can lead to inaccurate models and unreliable results. Common techniques used in data preprocessing include: ● **Data Cleaning**: Removing or correcting inaccuracies, duplicate records, and missing values to improve data quality. ● **Normalization**: Scaling data to a standard range (e.g., 0 to 1) to ensure that no single feature disproportionately influences the model. ● **Encoding Categorical Variables**: Converting categorical data into numerical format using techniques like one-hot encoding, making it suitable for algorithm processing. ● **Feature Selection**: Identifying and selecting the most relevant features from the dataset that contribute to the model's predictive power. Effective data preprocessing enhances model performance and increases the likelihood of achieving accurate results.	4
Q. 19	**Answer**: Data collection is a foundational step in the AI project cycle that involves gathering the necessary data to train and evaluate AI models. The quality and quantity of the data directly impact the model's performance and its ability to make accurate predictions. Common sources of data for AI projects include: ● **Public Datasets**: Pre-existing datasets available from government organizations, research institutions, or online repositories (e.g., Kaggle, UCI Machine Learning Repository). ● **Surveys and Questionnaires**: Custom data can be collected through surveys or questionnaires targeted at	4

	specific audiences to gather insights. **Web Scraping**: Extracting data from websites using automated tools to gather large volumes of information. **IoT Devices**: Data collected from sensors and devices that provide real-time information, particularly in fields like healthcare and smart cities.	
Q 20	To normalize this feedback, follow these steps: **Convert to lowercase**: Convert all text to lowercase to make analysis uniform. - Result: "the service was excellent!!! but the delivery was late... very slow response :(" **Remove punctuation**: Eliminate unnecessary punctuation. - Result: "the service was excellent but the delivery was late very slow response" **Correct spelling (Optional)**: You may want to correct spelling errors for further clarity, especially if feedback contains typos. - Result: If there were misspelled words like "excellnt" or "responce," they would be corrected to "excellent" and "response." **Remove stop words (Optional)**: For specific tasks, words like "the" and "was" could be removed if they don't add value to analysis. - Result (if stop words are removed): "service excellent delivery late slow response" The normalized feedback is: **"service excellent delivery late slow response"**	**4 mar ks**
Q 21	Ans: (i)the total number of wrong predictions made by the model is the sum of false positive and false negative. FP+FN=40+12 = 52 (ii) Precision=TP/(TP+FP) =50/(50+40) 50/90 =0.55 Recall=TP/(TP+FN) =50/(50+12) =50/62 =.81 F1 Score = 2*Precision*Recall/(Precision+Recall) =2*0.55*.81/(.55+.81) =.891/1.36 =0.65 (1 marks for part (i) and ½ mark for each formula and ½ mark each for substitution of values in part(ii)) Please note: the mathematical calculations can be ignored	**4**

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