B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

PERIODIC TEST-I : 2025-26
ARTIFICIAL INTELLIGENCE (417)

Class: X **Time : 1 hr.**
Date: 01-07-2025 **Max Marks: 25**
Admission No. : …..…… **Roll No. :**

General Instructions:

1. *Please read the instructions carefully.*
2. *This Question Paper contain two sections: Section A & Section B.*
3. *Section A has Objective type questions whereas Section B contains Subjective type questions.*
4. *All questions of a particular section must be attempted in the correct order.*
5. ***SECTION A - OBJECTIVE TYPE QUESTIONS (07 MARKS):***
   - *i. This section has 01 question.*
   - *ii. Marks allotted are mentioned against question/part.*
   - *iii. There is no negative marking.*
   - *iv. Do as per the instructions given.*
6. ***SECTION B – SUBJECTIVE TYPE QUESTIONS (18 MARKS):***
   - *i. This section has 14 questions.*
   - *ii. A candidate has to do 8 questions.*
   - *iii. Do as per the instructions given.*
   - *iv. Marks allotted are mentioned against each question/part.*

ANSWER KEY

SECTION A: OBJECTIVE TYPE QUESTIONS

Q.(1) Answer any 7 out of the given 10 questions : **(7 x 1 = 7)**

(i) Which of the following is not a typical stage in the AI Project Cycle ?
(a) Modelling
(b) Data Exploration
(c) Deployment
(d) Data generation

(ii) How does Google Translate utilise NLP ?
(a) By analysing sentence structure and context to translate text
(b) By categorising languages into specific types
(c) By predicting the next word in a sentence
(d) By checking for grammatical errors in documents

(iii) What is the purpose of defining the problem statement during the Problem Scoping stage in an AI Project Cycle ?
(a) To collect data **(b) To understand the aim and objective of the project**
(c) To train the model (d) To process data

(iv) Which ethical framework is based on respecting and upholding individual rights ?
(a) Right based ethical framework (b) Utility based ethical framework
(c) Sector based ethical framework (d) Virtue based ethical framework

(v) Which algorithm is primarily used in image related tasks like facial recognition ?
(a) Regression (b) ANN **(c) CNN** (d) Classification

(vi) Artificial Neural Networks are inspired by the structure and function of :
(a) The human brain (b) Quantum computers
(c) Complex mathematical models (d) High speed processors

(vii) Which of these is an example of a classification problem ?
(a) Predicting house prices (b) Grouping customers based on spending
(c) Determining if an email is spam (d) Predicting the temperature

(viii) Which of the following is an example of reinforcement learning ?
(a) Identifying spam emails (b) Predicting house prices
(c) A robot learning to pick objects through trial and error
(d) Grouping customers based on purchase history

(ix) The …… of meaningful information is conveyed back to the sender to complete the communication cycle.
(a) Sender (b) Receiver
(c) Feedback (d) Message

(x) Which of the following is an interpersonal barrier ?
(a) Social anxiety (b) Poor self esteem
(c) Not willing to talk **(d) All of these**

SECTION B: SUBJECTIVE TYPE QUESTIONS

Answer any 6 out of the given 10 questions: **(6 x 2 = 12)**

Q. (2) What do you mean by Bioethics ? Explain.
Ans. : Bioethics is the study of ethical issues that arise in the fields of medicine, biology, and healthcare. It involves examining questions about what is right or wrong in medical practices, research involving human subjects, genetic engineering, organ transplantation, end-of-life care, and more. Bioethics aims to ensure that scientific advancements and medical treatments respect human dignity, individual rights, and moral values. It often involves input from doctors, scientists, ethicists, and the public to guide responsible decision-making in healthcare and research.

Q. (3) What is the need of ethical frameworks for AI ? Explain any two points.
Ans. :
Fairness and Bias : AI should treat everyone equally. Ethical framework help reduce bias in AI, ensuring it doesn't favour one group over another.
Privacy and data protection : AI uses a lot of personal data, so guidelines are needed to protect people's privacy and ensure data is used responsibly.
Environmental impact :
Accountability :
Transparency and explainability :

Q. (4) Explain any two applications of Statistical Data.
Ans. :
Recommendation system : It uses statistical data to suggest personalised content to users. By analysing user behaviour preferences and historical interactions, AI models, moies and music are prime examples of platforms using such systems.
Price comparison websites : These websites are platforms that allow users to compare prices of products or services offered by multiple sellers.
Weather forecasting :

Q. (5) The Face Lock feature in smartphones is an application of Artificial Intelligence. Explain how this feature works and identify the AI domain it belongs to.

Ans. : The Face Lock feature in smartphones is an application of Artificial Intelligence (AI) that uses facial recognition technology to unlock the device by identifying the user's face. Here's how it works:

The smartphone's front camera captures an image of the user's face. AI algorithms then analyze key facial features such as the distance between the eyes, the shape of the nose, jawline, and other unique patterns. These features are compared with the stored facial data (taken during the initial setup). If the match is accurate, the phone unlocks.

This feature belongs to the AI domain of Computer Vision, which enables machines to interpret and understand visual information from the world. It also involves Machine Learning, as the system improves over time by learning to recognize the user's face under different lighting conditions, angles, and even with minor changes like a beard or glasses.

Q. (6) How does Video Game AI demonstrate Reinforcement Learning ?
Ans. : A video game character (AI) learns to play a game like chess, GO, Atari games. In video game AI, Reinforcement Learning allows agents to learn optimal strategies by exploring the game environment, receiving rewards for achieving objectives, and penalties for failing, improving their performance over time.

Q. (7) Explain any four applications of machine learning in our daily lives.
Ans. :

1. Personalized Recommendations: Streaming platforms like Netflix, YouTube, and shopping sites like Amazon use machine learning to analyze your behavior and preferences, offering personalized suggestions for movies, videos, or products.
2. Virtual Assistants: AI assistants like Siri, Google Assistant, and Alexa use machine learning to recognize speech, understand commands, and learn user habits to give more accurate and helpful responses.
3. Email Spam Filtering: Email services like Gmail use machine learning algorithms to automatically detect and move spam or phishing emails to the spam folder by learning from data patterns and user feedback.
4. Face Recognition: Smartphones and social media platforms use machine learning for facial recognition to unlock devices or tag people in photos by identifying unique facial features.
5. Navigation and Traffic Prediction: Apps like Google Maps and Waze use machine learning to analyze location data, traffic patterns, and user reports to suggest the fastest routes and predict travel time.
6. Online Banking and Fraud Detection: Banks use machine learning to detect suspicious transactions by identifying unusual spending behavior, helping to prevent fraud and protect users' accounts.

Q. (8) Differentiate between labelled and unlabelled dataset.
Ans. :

Aspect	Labeled Dataset	Unlabeled Dataset
Definition	Data that includes input **and** corresponding **output labels**.	Data that includes input **without** output labels.
Usage	Used in **supervised learning**.	Used in **unsupervised learning**.
Example	Images of animals with tags like "cat", "dog", etc.	Images of animals without any tags or categories.
Human Involvement	Requires human effort to label the data.	Does not require manual labeling.
Model Training	Helps train models to make predictions based on known outputs.	Helps discover patterns or groupings in data.
Accuracy	Usually results in higher accuracy due to clear guidance.	May be less accurate unless combined with other techniques.

Q. (9) What is Rule based approach ? Write any one drawback of it.
Ans. :

A Rule-Based Approach in artificial intelligence is a method where a system makes decisions based on a set of predefined rules written by humans. These rules are typically in the form of "if-then" statements. For example:
If the temperature is above 30°C, then turn on the fan.

It works well for simple, clearly defined problems where all possible scenarios can be anticipated.

Drawback:
One major drawback of the rule-based approach is that it cannot handle complex or unpredictable situations well, as it relies strictly on predefined rules and lacks the ability to learn from new data.

Q. (10) Explain any two of 7C's of effective communication.
Ans. :
Clear : The message intended to be delivered through communication should be clear and in understandable format.
Concise : The message must be conveyed by using only limited words. Avoid using fancy, unwanted or repetitive words or fillers otherwise the actual message intended to be conveyed may get lost on the long content.
Concrete :
Correct :
Coherent :
Complete :
Courteous :

Q. (11) What is communication ? Explain different methods of communication.
Ans. : It is defined as the act of conveying meanings fron on entity or group to another through the use of mutually understood signs, symbols and semiotic rules.

Verbal Communication:
Involves the use of **spoken or written words** to convey messages.

- *Examples*: Face-to-face conversations, phone calls, speeches, emails, and text messages.

Non-Verbal Communication:
Involves **body language, gestures, facial expressions, eye contact**, and posture to communicate without words.

- *Examples*: Nodding to show agreement, crossing arms to show resistance.

Visual Communication:
Uses **images, symbols, charts, graphs, and diagrams** to present information visually.

- *Examples*: Infographics, traffic signs, PowerPoint presentations.

Answer any 2 out of the given 4 questions : (2 x 3 = 6)

Q.(12) What is Natural Language Processing ? Explain any two real life applications of NLP.
Ans. :

Natural Language Processing (NLP) is a branch of Artificial Intelligence (AI) that focuses on enabling computers to **understand, interpret, and respond to human language** in a meaningful way. It combines computer science, linguistics, and machine learning to process and analyze large amounts of natural language data, such as speech or text.

Two Real-Life Applications of NLP:

1. **Chatbots and Virtual Assistants**:
   NLP powers assistants like **Siri**, **Alexa**, and **Google Assistant** to understand spoken language and respond to user commands. It allows these tools to perform tasks like setting alarms, answering questions, or sending messages.
2. **Language Translation**:
   Tools like **Google Translate** use NLP to translate text or speech from one language to another. They analyze sentence structure and context to provide more accurate translations between different languages.

Q.(13) Akhil wants to learn how to scope the problem for an AI Project. Explain him the following :
(a) 4W Problem canvas
(b) Problem Statement Template
Ans. :
(a) 4W Problem canvas :
Who : It identifies who will benefit from the Ai solution as well as any stake holders involved in the project.
What : It defines the specific problem or challenge that needs to be addressed with AI.
Where : This step focuses on where the AI solution will operate or be implemented.
Why : It explores the reason behind solving the problem.

(b) Problem Statement Template : Once you have completed the 4Ws problem canvas, the next step is to consolidate all the information into a single, comprehensive template.

Q.(14) Explain the three basic layers of Artificial Neural Network.
Ans. :

An Artificial Neural Network (ANN) is made up of layers that process data in a way similar to the human brain. The three basic layers of an ANN are:

1. **Input Layer:**
   This is the first layer of the network. It receives the raw data (features) from the outside world and passes it into the network. Each node (neuron) in this layer represents one feature of the input data.
   Example: In image recognition, each input neuron might represent a pixel value.
2. **Hidden Layer(s):**
   These are the middle layers between the input and output. They perform computations using weights, biases, and activation functions to learn patterns and relationships in the data. There can be one or multiple hidden layers depending on the complexity of the model.
   These layers are where the actual "learning" happens.
3. **Output Layer:**
   This is the final layer, which produces the result or prediction of the network. The number of neurons in this layer depends on the task—e.g., one neuron for binary classification, or multiple neurons for multi-class classification.

Q.(15) Explain any three examples of Regression Model.
Ans. :
Income Prediction :

A regression model can be used to predict a person's **annual income** based on factors like education level, years of experience, job role, location, and age.

- **Model Type**: Linear Regression or Multiple Linear Regression
- **Use Case**: Helpful in HR analytics and financial planning.

House price prediction :

This model estimates the **price of a house** based on features such as square footage, number of bedrooms and bathrooms, location, age of the property, and proximity to amenities.

- **Model Type**: Linear Regression, Decision Tree Regression, or Random Forest Regression
- **Use Case**: Used by real estate agencies and property investors.

Temperature prediction :

Regression models can forecast **future temperatures** based on historical weather data, time of year, humidity, and wind speed.

- **Model Type**: Time Series Regression or Polynomial Regression
- **Use Case**: Used in weather forecasting systems.

Car price prediction :

********** ALL THE BEST **********