B.K. BIRLA CENTRE FOR EDUCATION

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

PRE BOARD 3 EXAM : 2025-26
ARTIFICIAL INTELLIGENCE (417)

Class: X (SET 02) **Time : 2 Hrs.**
Date: 12-01-2026 **Max Marks: 50**
Admission No. : …..…… **Roll No. :**

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 question.*
   - ii. *Marks allotted are mentioned against question/part.*
   - iii. *There is no negative marking.*
   - iv. *Do as per the instructions given.*
7. ***SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):***
   - i. *This section has 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.*

MARKING SCHEME

SECTION A: OBJECTIVE TYPE QUESTIONS

Q.(1) Answer any 4 out of the given 6 questions on Employability Skills. **(4 x 1 = 4)**

(i) Which of these is not a common communication barrier ?
(a) Linguistic barrier (b) Interpersonal barrier
(c) Financial barrier (d) Organisational barrier

(ii) The self management skills of an employee are very important at the workplace to acquire
(a) Driving skill (b) maintenance skill
(c) Self confidence (d) Physical strength

(iii) What makes you complete work or studies without others cheering you ?
(a) Self confidence (b) Communication
(c) Self motivation (d) Self esteem

(iv) Which of the following are individuals who use the internet to exploit, manipulate or abuse others ?
(a) Online predators (b) Worms
(c) Trojan horse (d) Antivirus

(v) Which of the following is a myth related to entrepreneurship ?
(a) Need a lot of money (b) Have a great idea
(c) Should know everything about business **(d) All of these**

(vi) Which organisation has made the sustainable development goals ?
(a) United Nations (b) League of Nations
(c) UNICEF (d) World Health Organisation

Q.(2) Answer any 5 out of the given 6 questions. (5 x 1 = 5)

(i) Unemployment

(ii) Which of the following is NOT an application of computer vision ?
(a) Categorising photos in a smartphone
(b) Identifying faces in CCTV footage
(c) Playing music based on mood
(d) Enabling self driving cars

(iii) What is the main goal of the data acquisition stage in AI project ?
(a) To collect raw data for analysis and reference
(b) To visualise data using statistical methods
(c) To test the AI model (d) To deploy the model into production

(iv) Computer vision

(v) Which ethical framework emphasises good character traits such as kindness and compassion?
(a) Value based ethical framework **(b) Virtue based ethical framework**
(c) Right based ethical framework (d) Utility based ethical framework

(vi) State True or False :
True

Q.(3) Answer any 5 out of the given 6 questions. (5 x 1 = 5)

(i) Which of the following is labelled data ?
(a) Unmarked data **(b) Marked or tagged data**
(c) Raw data (d) Unusable data

(ii) Machine Learning focuses on …….
(a) Building circuits **(b) Learning from data**
(c) Simulating emotions (d) Physical robots

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

(iv) Which term refers to the actual value being positive, but the model predicting it as negative?
(a) True Positive (b) False Positive
(c) False Negative (d) True Negative

(v) Which metric is used to reduce the no. of false positives and false negatives ?
(a) Accuracy **(b) F1 Score**
(c) Precision (d) Recall

(vi) Which evaluation technique involves dividing the dataset into training and testing subsets?
(a) Precision (b) Gradient boosting
(c) Train test split (d) Recall

Q.(4) Answer any 5 out of the given 6 questions. (5 x 1 = 5)

(i) Which of the following statements is true about F1 score ?
(a) F1 score is the average of precision and recall

(b) F1 score only considers false negatives
(c) F1 score is the sum of precision and recall
(d) F1 score is always equal to the accuracy of the model.

(ii) What is the primary purpose of model evaluation in machine learning ?
(a) To reduce the size of the dataset
(b) To measures the model's performance and ensure it generalizes well to unseen data
(c) To increase the complexity of the model
(d) To avoid the need fro real world testing

(iii) In which scenario is a model said to be "underfitting" ?
(a) The model performs poorly on both training and test sets
(b) The model performs well on both training and test sets
(c) The model memorizes the training data but fails to generalize
(d) The model performs well on the training set but poorly on the test set

(iv) In a grayscale image, what does the darkest shade represent ?
(a) Total presence of colour **(b) Zero value of pixel**
(c) Lightest shade of gray (d) Maximum pixel value

(v) What is the primary goal of computer vision ?
(a) To understand and interpret visual information from the world
(b) To simulate human brain activity
(c) To create 3D models from images
(d) To develop algorithms for natural language processing

(vi) Object detection and handwriting recognition are examples of tasks commonly associated with :
(a) Computer vision (b) Image processing
(c) Both a and b (d) None of these

Q.(5) Answer any 5 out of the given 6 questions. (5 x 1 = 5)

(i) Which of the following is the real world example of image processing ?
(a) Self driving cars (b) Automated surveillance systems
(c) Removing red eye effects in photos (d) Virtual Reality devices

(ii) Which NLP stage arranges words and sentences according to the grammar of the language ?
(a) Lexical analysis **(b) Syntactic analysis**
(c) Semantic analysis (d) Pragmatic analysis

(iii) Which of the following is not a rule that governs languages ?
(a) Syntax (b) Lexicon
(c) Algorithm (d) Semantics

(iv) Conversation, Robot

(v) Which term refers to the number of documents in which a specific word appears, irrespective of how many times it occurs in those documents ?
(a) Word frequency (b) Term frequency
(c) Document frequency (d) Inverse document frequency

(vi) What do personal assistant applications like Siri, Cortana and Alexa primarily use to understand human language ?
(a) Image recognition **(b) NLP**
(c) Data analysis (d) Machine learning algorithms

SECTION B: SUBJECTIVE TYPE QUESTIONS

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

Q.6 What is communication? Give any two measures to overcome barriers to effective communication.

Communication is the process of exchanging information, ideas, thoughts or feelings between two or more people to achieve mutual understanding. Effective communication ensures that the message sent is clearly understood by the receiver.

Measures to overcome barriers:

1. Use simple and clear language to avoid misunderstanding.
2. Encourage feedback to confirm that the message has been correctly received and understood.

Q.7 What are the tips for practicing the four steps for effective time management?

The four steps of time management are **setting goals, prioritizing tasks, creating a schedule, and reviewing progress**.
To practice these effectively, set clear and realistic goals, arrange tasks according to importance, follow a daily or weekly timetable, avoid distractions, and regularly review work to make necessary improvements and adjustments.

Q.8 List any four important functions performed by an operating system.

An operating system performs several important functions such as **process management**, which controls execution of programs; **memory management**, which allocates and deallocates memory; **file management**, which organizes and stores files; and **device management**, which controls input and output devices.

Q.9 Explain in detail any four functions performed by an entrepreneur.

An entrepreneur performs many important functions. **Innovation** involves developing new products or ideas. **Risk bearing** means taking responsibility for business uncertainties. **Decision making** helps choose the best course of action. **Management and leadership** involve organizing resources, guiding employees and ensuring smooth functioning of the enterprise.

Q.10 What do you mean by green skills? What initiative is taken by the Government of India in this context?

Green skills are abilities that support environmental sustainability and efficient use of resources. They help reduce pollution and promote eco-friendly practices. The Government of India has launched initiatives like the **Skill Council for Green Jobs** to train people in renewable energy, waste management and sustainable development sectors.

Answer any 4 out of the given 6 questions in 20-30 words each. (4 x 2 = 8)

Q.11 What is the need of ethical frameworks for AI? (Any four points)

Ethical frameworks for AI are necessary to ensure that artificial intelligence systems are developed and used responsibly. They help prevent bias and discrimination, protect user privacy and personal data, ensure transparency and accountability in AI decisions, and promote fairness and trust. Ethical frameworks also ensure AI benefits society and avoids misuse.

Q.12 Differentiate between labelled and unlabelled dataset.

A **labelled dataset** contains input data along with correct output labels or answers, such as images tagged with names or categories. It is mainly used in supervised learning. An **unlabelled dataset** contains only input data without labels and is used in unsupervised learning to discover patterns or group data.

Q.13 Explain any two examples of Regression model.

One example of a regression model is **house price prediction**, where the model predicts the selling price based on size, location and number of rooms. Another example is **sales forecasting**, where future sales are predicted using past sales data, trends and seasonal patterns.

Q.14 Explain the concept of a confusion matrix and its components. How is it used to evaluate a classification model?

A confusion matrix is a table used to evaluate the performance of a classification model by comparing predicted and actual results. It consists of four components: **True Positive (TP), False Positive (FP), True Negative (TN), and False Negative (FN)**. These values are used to calculate performance metrics like accuracy, precision, recall and F1 score.

Q.15 What is Computer Vision and how does it relate to AI? Explain in detail.

Computer Vision is a field of artificial intelligence that enables machines to interpret and understand visual information from images and videos. It uses AI techniques such as machine learning and deep learning to recognize objects, faces, text and patterns. Computer vision applications include facial recognition, medical imaging, self-driving cars and surveillance systems.

Q.16 What is NLP? Define language translation.

Natural Language Processing (NLP) is a branch of artificial intelligence that allows computers to understand, interpret and generate human language. **Language translation** is an NLP application that converts text or speech from one language into another, enabling communication between people speaking different languages.

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

Q.17 Explain all the steps of the AI Project Cycle.

The **AI Project Cycle** provides a structured approach to build AI solutions. It consists of the following steps:

1. **Problem Scoping:**
   The problem is clearly defined by identifying the goal, stakeholders, constraints, and expected outcomes using tools like the 4Ws canvas.
2. **Data Acquisition:**
   Relevant data is collected from sources such as databases, sensors, surveys, or the internet. The quality and quantity of data are crucial at this stage.
3. **Data Exploration:**
   The collected data is analysed to identify patterns, trends, missing values, and outliers. This helps in understanding the nature of the data.
4. **Modeling:**
   Appropriate AI or machine learning models are selected and trained using the prepared data to make predictions or decisions.
5. **Evaluation:**
   The model's performance is tested using metrics like accuracy, precision, recall, etc., to ensure reliability before deployment.

Q.18 Differentiate between Machine Learning and Deep Learning.

Machine Learning is a subset of AI where models learn patterns from data using algorithms like regression or decision trees. It requires manual feature extraction and works well with smaller datasets.
Deep Learning is a subset of machine learning that uses neural networks with multiple layers. It automatically extracts features, requires large datasets, and performs better in complex tasks like image and speech recognition.

Q.19 Name and explain any four real-world applications of Neural Networks.

1. **Image Recognition:**
   Neural networks identify objects, faces, and text in images, used in facial recognition and photo tagging.
2. **Speech Recognition:**
   Used in voice assistants like Siri and Google Assistant to convert speech into text.
3. **Medical Diagnosis:**
   Helps detect diseases such as cancer by analysing X-rays and MRI scans.
4. **Fraud Detection:**
   Neural networks analyse transaction patterns to detect unusual or fraudulent activities in banking systems.

Q.20 Calculate Accuracy, Precision, Recall and F1 Score.

Given Confusion Matrix:

	Predicted Fraud	**Predicted Not Fraud**
Actual Fraud	TP = 40	FN = 10
Actual Not Fraud	FP = 20	TN = 930

Total transactions = 1000

Formulas and Calculations:

Accuracy = (TP+TN)/Total = 0.97=97%

Precision = TP/(TP+FP) = 0.67

Recall = TP/(TP+FN) = 0.80

F1 Score = 2×(Precision×Recall)/(Precision+Recall) = 0.73

Q.21 Apply Bag of Words (BoW) model and create a document vector table.
Documents:

- **D1:** A deep learning model requires data
- **D2:** A model learns from training data

Step 1: Text Pre-processing (lowercase, tokenization)

D1 → a, deep, learning, model, requires, data
D2 → a, model, learns, from, training, data

Step 2: Vocabulary Creation

Vocabulary = **a, deep, learning, model, requires, data, learns, from, training**

Step 3: Word Frequency Count

Word	**D1**	**D2**
a	1	1
deep	1	0
learning	1	0
model	1	1
requires	1	0
data	1	1
learns	0	1
from	0	1
training	0	1

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