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

(ii) Which one of the following is achieved by physical exercise and fresh air, which are part of self management techniques ?
(a) Healthy mind and body (b) Weight
(c) Speaking power (d) Driving skill

(iii) What is important for building self motivation ?
(a) Finding your faults (b) Copying others
(c) Focus on goals (d) Take it easy

(iv) How can an antivirus protect your device ?

(a) It can protect it from overheating (b) It can increase its performance
(c) It can prevent data from getting corrupt.(d) It can backup data

(v) Which of the following is the reason of success of an entrepreneur ?
(a) Hard work (b) Good money
(c) Good degree (d) Use expensive material

(vi) Choose the option which is not a sustainable development goal according to the United Nations
(a) Clean water and sanitation (b) Gender equality
(c) Population (d) Reduced inequalities

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

(i) Computer Vision

(ii) What is the primary purpose of AI Project Cycle ?
(a) To provide a set of random steps for I development
(b) To systematically plan, develop and deploy AI solutions
(c) To focus only on the final implementation of AI systems
(d) To perform data analysis without a structured plan

(iii) What do framework provides in the context of problem solving ?
(a) Random solutions **(b) Step by step guidance**
(c) Legal advice (d) Ethical justification

(iv) NLP

(v) Which of the following is NOT a real time application of NLP ?
(a) Image recognition (b) Chatbots
(c) Plagiarism checker (d) Sentiment Analysis

(vi) State True or False : False

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

(i) Which machine learning technique is best for grouping customers based on their shopping behaviours ?
(a) Regressioin (b) Classification
(c) Association **(d) Clustering**

(ii) 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

(iii) Which of the following is NOT a sub category of supervised learning ?
(a) Classification (b) Regression
(c) Clustering (d) Predictive modelling

(iv) Which metric measures how many positive predictions made by the model are actually correct?
(a) Recall **(b) Precision**
(c) Accuracy (d) F1-Score

(v) What does a “perfect fit” represent in model evaluation ?
(a) The ideal balance between complexity and generalisation
(b) High bias and low variance (c) Low bias and high variance
(d) Overfitting the training data

(vi) Which metric is most suitable when you want to minimise false positives ?
(a) Accuracy **(b) Precision**
(c) Recall (d) F1 score

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

(i) What is True Positive (TP) in the confusion matrix ?
(a) When the model predicts a negative value correctly
(b) When the model predicts a negative value incorrectly
(c) When the model predicts a positive value incorrectly
(d) When the model predicts a positive value correctly

(ii) How is the relationship between model performance and accuracy described ?
(a) Inversely proportional (b) Not related
(c) Directly proportional **(d) Randomly fluctuating**

(iii) Which of the following is true about a confusion matrix ?
(a) The confusion matrix shows only the correct predictions of a model.
(b) The diagonal elements of a confusion matrix represent the false positives and false negatives.
(c). The confusion matrix can be used to calculate accuracy, precision, recall and F1 score.
(d) The confusion matrix is used only for regression problems.

(iv) What technology does Google's search by image feature rely on ?
(a) Speech recognition **(b) Computer vision**
(c) Data compression (d) Text based search only

(v) What is the purpose of facial recognition in smart homes ?
(a) To increase internet speed
(b)To recognise family members for security purposes
(c) To generate digital filters (d) To track weather changes

(vi) What is the core task of image classification ?
(a) Identifying objects and their locations in images
(b) Segmenting objects into individual pixels
(c) Assigning an input image one label from a fixed set of categories
(d) Detecting instances of real world objects in images

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

(i) How is resolution typically expressed ?
(a) By the number of pixels along the width and height, such as 1280 X 1024
(b) By the brightness level of each pixel ranging from 0 to 255
(c) By the total number of pixels, such as 5 megapixels
(d) By the arrangement of pixels in a 2-dimensional grid

(ii) Which stage of NLP converts speech into text and arranges them into sentences and paragraphs ?
(a) Lexical analysis (b)Syntactic analysis
(c) Named entity recognition (d) Machine translation

(iii) What does AI enable machines to do in NLP ?
(a) To recognise images
(b) To handle complex language, including semantics (meaning), context and structure
(c) To make decisions based on data (d) To create new languages

(iv) Voice assistants

(v) Which step in text processing creates a list of all unique words in the normalised corpus ?
(a) Text normalisation (b) Stemming
(c) Create dictionary (d) Create document vector

(vi) What does lexicon refer to in language ?
(a) The set of rules for sentence structure (b) The collection of all sounds in a language
(c) The complete set of words and their meaning
(d) The understanding of word context

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 Explain any four of the 7 C's of effective communication.

The 7 C's of effective communication ensure clarity and understanding.

1. **Clear:** The message should be simple and easy to understand without confusion.
2. **Concise:** The message should be brief and to the point, avoiding unnecessary details.
3. **Correct:** Information shared should be accurate and error-free.
4. **Complete:** The message must include all necessary information so the receiver can respond properly.

Q.7 Explain the ABC of stress management.

The ABC model helps in managing stress effectively.
A – Activating event: A situation that causes stress, such as exams or deadlines.
B – Belief: Thoughts or beliefs about the event, which may be positive or negative.
C – Consequence: Emotional and behavioral reaction to the belief. Positive beliefs reduce stress.

Q.8 Explain two ways in which personal information can be lost or leaked.

Personal information can be lost through **phishing attacks**, where fake emails or websites trick users into sharing sensitive data. Another way is **malware or hacking**, where malicious software accesses private data without permission, causing data leaks or identity theft.

Q.9 Write four advantages and four disadvantages of being an entrepreneur.

Advantages:

1. Freedom to make decisions
2. Opportunity to earn higher profits
3. Personal satisfaction and creativity
4. Flexible working hours

Disadvantages:

1. High financial risk
2. Irregular income
3. Long working hours
4. High stress and responsibility

Q.10 List four Sustainable Development Goals. Explain any two.

Four Sustainable Development Goals (SDGs):

1. No Poverty
2. Zero Hunger
3. Quality Education

4. Climate Action

Explanation:
No Poverty aims to end poverty by ensuring basic needs and equal opportunities for all.
Quality Education focuses on providing inclusive and equitable education to promote lifelong learning and skill development.

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

Q.11 Write briefly about the second and third stage of the AI Project Cycle.

The **second stage** of the AI project cycle is **Data Acquisition**. In this stage, relevant data is collected from various sources such as surveys, sensors, databases, or the internet. The data should be accurate, sufficient, and relevant to the problem.

The **third stage** is **Data Exploration**. Here, the collected data is analyzed to identify patterns, trends, missing values, and inconsistencies. This stage helps in understanding the data better before model building.

Q.12 What is rule-based approach? Write any one drawback of it.

The **rule-based approach** is an AI method where decisions are made using predefined rules written by humans in the form of "if-then" statements. The system follows these rules to solve problems.

Drawback: Rule-based systems are rigid and cannot learn or adapt to new situations automatically, making them unsuitable for complex and changing environments.

Q.13 How does reinforcement learning differ from supervised and unsupervised learning?

In **supervised learning**, the model is trained using labelled data with known outputs. In **unsupervised learning**, the model works on unlabelled data to find patterns or groups. In contrast, **reinforcement learning** learns through trial and error by interacting with an environment and receiving rewards or penalties based on actions taken.

Q.14 How does the F1 score help in evaluating a classification model?

The **F1 score** is a performance metric that combines **precision** and **recall** into a single value. It is especially useful when dealing with imbalanced datasets. A high F1 score indicates that the model has low false positives and false negatives, making it more reliable for classification tasks.

Q.15 Enlist two smartphone apps that utilise computer vision technology. How have these apps improved efficiency or convenience?

Two smartphone apps using computer vision are **Google Lens** and **Face Unlock**. Google Lens helps in identifying objects, translating text, and scanning documents instantly. Face Unlock improves convenience by allowing quick and secure phone access without passwords, saving time and enhancing user experience.

Q.16 Identify the stage of NLP and explain.

Sentence 1: *"We are to the zoo going tomorrow."*
Sentence 2: *"We are going to the zoo tomorrow."*

The NLP stage involved here is **Syntax Analysis**. Syntax analysis checks the grammatical structure and word order of a sentence. It helps identify whether a sentence follows correct grammar rules. The first sentence is grammatically incorrect, while the second sentence is syntactically correct.

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

Q.17 Will it be valid to say that not all "smart" devices are AI enabled? Justify with examples.

Yes, it is valid to say that not all devices termed as "smart" are AI enabled. Many smart devices operate using **predefined rules, sensors, and automation**, not intelligence or learning.
For example, a **washing machine with preset modes** is often called smart, but it simply follows programmed instructions. Similarly, a **motion-sensor light** turns on automatically using sensors, not AI. These devices do not learn, adapt, or make intelligent decisions, which are key characteristics of AI systems.

Q.18 What is a Neural Network? Explain the functions of its three layers.

A **neural network** is a computational model inspired by the human brain, consisting of interconnected artificial neurons that process information and learn patterns from data.

- **Input Layer:** Receives raw input data such as images, numbers, or text features.
- **Hidden Layer:** Processes inputs using weights and activation functions to identify patterns and relationships.
- **Output Layer:** Produces the final result or prediction, such as classification or numerical output.

Q.19 Identify the type of model used in the following case studies.

(a) Loan default prediction (default / non-default) → **Classification model**
Reason: The output is categorical (two possible classes).

(b) Predicting house selling price → **Regression model**
Reason: The output is a continuous numerical value.

(c) Customer segmentation for marketing → **Clustering model**
Reason: Customers are grouped based on similarities without predefined labels.

(d) Products bought together in a grocery store → **Association model**
Reason: The task identifies relationships and patterns among purchased items.

Q.20 Calculate Accuracy, Precision, Recall and F1 Score.
Given Confusion Matrix:

	Predicted Yes	**Predicted No**
Actual Yes	TP = 85	FN = 25
Actual No	FP = 30	TN = 160

Total = 85 + 25 + 30 + 160 = 300
Formulas & Calculations:

Accuracy = (TP+TN)/Total = =0.817 = 81.7%

Precision = TP/(TP+FP) = 0.739

Recall = TP/(TP+FN) = 0.773

F1 Score = 2×(Precision×Recall) / (Precision+Recall) = 0.756

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

- **D1:** Dogs are loyal animals
- **D2:** Cats are loyal too

Step 1: Preprocessing (lowercase & tokenization)

D1 → dogs, are, loyal, animals
D2 → cats, are, loyal, too

Step 2: Vocabulary Creation

Vocabulary: dogs, are, loyal, animals, cats, too

Step 3: Frequency Count & Vector Table

Word	**D1**	**D2**
dogs	1	0
are	1	1
loyal	1	1
animals	1	0
cats	0	1
too	0	1

This table represents the **document vectors** generated using the Bag of Words model.

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