B.K. BIRLA CENTRE FOR EDUCATION

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

TERM 1 EXAMINATION (2025-26)
ARTIFICIAL INTELLIGENCE (417)

Class: X **Time : 2 hrs.**
Date: 05-09-2025 **Max Marks: 50**
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 (24 MARKS):***
   - i. *This section has 05 questions.*
   - 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 (26 MARKS):***
   - i. *This section has 16 questions.*
   - ii. *A candidate has to do 11 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 4 out of the given 6 questions on Employability Skills. **(4 x 1 = 4)**

(i) In which communication, exact words and facts are used ?
(a) Clear (b) Concise
(c) Concrete (d) CorrectMessage

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

(iii) Which of the following are types of motivation ?
(a) Internal (b) Intermediate
(c) External **(d) Both a and c**

(iv) Ravi works hard to get the best student award at the end of year. What type of information is this ?
(a) Internal **(b) External**
(c) Virtual (d) Both a and b

(v) What happens if you leave a device plugged in even after it is charged 100%.
(a) It can break (b) It can stop functioning
(c) It can overheat (d) Data can get corrupt

(vi) 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

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

(i) 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

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

(iv) What is the primary domain of application for Bioethics ?
(a) Agriculture **(b) Healthcare and life sciences**
(c) Information technology (d) Environmental conservation

(v) 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

(vi) Which of the following type of data does Computer Vision primarily work with ?
(a) Audio signals **(b) Video and image data**
(c) Text data (d) Location data

Q.(3) Answer any 5 questions 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) Which Machine Learning techniques is best for grouping customers based on their shopping behaviours ?
(a) Regression (b) Classification
(c) Association **(d) Clustering**

(iii) An AI agent playing a game and learning from its rewards and penalties is an example of :
(a) Supervised Learning (b) Unsupervised Learning
(c) Reinforcement Learning (d) Evolutionary Learning

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

(v) 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

(vi) In grayscale images, a pixel value of 255 represents :

(a) Black **(b) White**
(c) Gray (d) Transparent

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

(i) What is the primary purpose of model evaluation in machine learning ?
(a) To reduce the size of the dataset
(b) To measure 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 for real world testing

(ii) 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

(iii) What does the classification accuracy of a model indicate ?
(a) The ability of the model to classify negative cases
(b) The number of false positives in the dataset
(c) The proportion of incorrect predictions
(d) The percentage of correct predictions out of total predictions

(iv) In a confusion matrix, the rows represent the …….. values of the target variable.
(a) Predicted **(b) Actual**
(c) Desired (d) Assigned

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

(vi) What does the pixel value represent in an image ?
(a) Width of the pixel **(b) Brightness or colour of the pixel**
(c) Height of the pixel (d) Resolution of the pixel

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

(i) How do AI systems learn ?
(a) By using human intelligence **(b) Through algorithms and data**
(c) By interacting with people (d) By collecting physical objects

(ii) How does Data Science support AI ?
(a) It creates raw data
(b) It acts as the backbone, helping AI systems learn and improve
(c) It stores data for later use
(d) It makes decisions for AI systems

(iii) The complete collection of raw data available for a test or experiment is called :
(a) A sample (b) A variable
(c) A dataset **(d) A population**

(iv) Which of the following is one of the main domains of AI ?
(a) Social Science **(b) Data Science**
(c) Physical Science (d) Mechanical Engineering

(v) What is the main purpose of Data Science ?
(a) To create computers **(b) To extract meaningful insights from data**
(c) To design websites (d) To write computer programs

(vi) Which of the following is an application of Computer Vision ?
(a) Speech recognition **(b) Autonomous vehicles**
(c) Text-to-speech conversion (d) Chatbot development

SECTION B: SUBJECTIVE TYPE QUESTIONS

Answer any 3 out of the given 4 questions on Employability Skills (3 x 2 = 6)

Q6. What is communication? Explain different methods of communication.

- **Communication** is the process of exchanging information, ideas, thoughts, or feelings between two or more people through a medium.
- It helps in understanding, decision-making, and building relationships.

Methods of Communication:

1. **Verbal Communication** – Using spoken words (face-to-face, phone calls, video calls).
2. **Non-verbal Communication** – Body language, gestures, eye contact, facial expressions.
3. **Written Communication** – Letters, emails, reports, social media posts.
4. **Visual Communication** – Charts, diagrams, infographics, presentations.

Q7. Explain any two of the 7C's of effective communication.

The **7C's** are principles that make communication effective.

- **Clarity** – Message should be clear and easy to understand, avoiding confusion.
- **Conciseness** – Use minimum words to convey message without unnecessary detail.
  (Other C's: Correctness, Completeness, Courtesy, Consideration, Concreteness)

Q8. Write and explain any four measures to protect your computer.

1. **Install Antivirus Software** – Protects system from viruses, malware, trojans.
2. **Use Strong Passwords** – Combination of letters, numbers, symbols; avoid sharing.
3. **Update Software Regularly** – Keeps system safe from new security threats.
4. **Avoid Suspicious Links/Emails** – Do not click unknown links or download untrusted files.

Q9. What do you mean by Operating System? Name any two operating systems.

- **Operating System (OS)**: A system software that manages computer hardware and software, provides interface between user and machine.
- Functions: File management, memory management, device control, user interface.
- Examples: **Windows, Linux, macOS, Android**.

Answer any 4 out of the given 6 questions: (4 x 2 = 8)

Q10. 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.

- Face lock uses **Computer Vision**.
- The camera captures facial features → AI model processes image using **Convolutional Neural Networks (CNNs)** → Matches unique patterns (eyes, nose, distance between features) with stored template.
- If match found → Device unlocks.
- **AI Domain**: **Computer Vision**.

Q11. What is Natural Language Processing (NLP)? Explain any two real-life applications of NLP.

- **NLP** is a branch of AI that enables machines to understand, interpret, and respond to human language (text or speech).

Applications:

1. **Chatbots** – Virtual assistants like Alexa, Google Assistant understand commands and reply.
2. **Sentiment Analysis** – Analysing reviews, tweets, feedback to know public opinion.

Q12. How does Video Game AI demonstrate Reinforcement Learning?

- In video games, AI agents learn by **trial and error**.
- They receive **rewards** for correct actions (winning, collecting points) and **penalties** for mistakes (losing lives).
- Over time, AI improves gameplay strategies.
- Example: AI in racing games learns optimal paths, or chess AI learns moves.

Q13. List the different evaluation models. Explain also.

Evaluation models check the **accuracy and performance** of AI systems.

1. **Confusion Matrix** – Shows TP, FP, FN, TN values.
2. **Accuracy** – Percentage of correct predictions.
3. **Precision** – How many predicted positives are actually correct.
4. **Recall (Sensitivity)** – How many actual positives were predicted correctly.
5. **F1 Score** – Harmonic mean of Precision & Recall (balances both).

Q14. What is Teachable Machine? Name any four popular no-code AI tools.

- **Teachable Machine**: Google's free, web-based tool to train AI models using images, sounds, or poses **without coding**.
- Users upload examples, system trains a model automatically.

No-code AI tools:

1. **Teachable Machine**
2. **Lobe** (by Microsoft)
3. **Runway ML**
4. **Peltarion**

Q15. Describe any three applications of facial recognition in Computer Vision.

1. **Security Authentication** – Unlocking phones, laptops using face ID.
2. **Attendance Systems** – Used in schools/companies to mark attendance automatically.
3. **Law Enforcement** – Police use it to identify suspects from CCTV footage.

Answer any 4 out of the given 6 questions : **(4 x 3 = 12)**

Q16. Explain steps of the AI Project Cycle.

1. **Problem Scoping** – Define the problem clearly and set goals.
2. **Data Acquisition** – Collect raw data (images, text, video, audio).
3. **Data Exploration** – Clean, analyse, and visualize data.
4. **Model Building** – Train AI model using Machine Learning algorithms.
5. **Evaluation** – Test model's accuracy with unseen data.
6. **Deployment** – Implement AI model in real-life usage.

Q17. How does Neural Networks work? Explain.

- Inspired by **human brain neurons**.
- Structure: **Input Layer → Hidden Layers → Output Layer**.
- Each connection has a **weight**. Inputs are multiplied by weights → passed through activation functions → produce output.
- Network learns by adjusting weights during training (backpropagation).
- Example: Recognizing handwritten digits, face detection.

Q18. Confusion Matrix Problem (School Transport)

Given matrix:

- TP = 22, FN = 47, FP = 12, TN = 18

Calculations:

- **Accuracy** = (TP+TN)/(TP+TN+FP+FN) = (22+18)/(99) = **40/99 ≈ 40.4%**
- **Precision** = TP/(TP+FP) = 22/34 ≈ **64.7%**
- **Recall (Sensitivity)** = TP/(TP+FN) = 22/69 ≈ **31.9%**
- **F1 Score** = 2 × (Precision×Recall)/(Precision+Recall) ≈ **42.9%**

Q19. Discuss the ethical concerns around model evaluation.

- **Bias & Fairness** – Models may discriminate against certain groups.
- **Transparency** – Black-box models make decisions unclear.
- **Privacy** – Use of sensitive data raises concerns.
- **Accountability** – Who is responsible for wrong predictions?
- **Misuse** – AI models can be used for harmful purposes (surveillance, manipulation).

Q20. Differentiate between Custom Code, Low Code, and No Code.

- **Custom Code** – Developer writes entire program; maximum flexibility, but time-consuming.
- **Low Code** – Uses drag-and-drop + minimal coding; faster than custom code.
- **No Code** – GUI-based, only configuration required; suitable for non-programmers.

Q21. Differentiate between Computer Vision and Image Processing. (Any 3 differences)

Computer Vision (CV)	Image Processing (IP)
AI field that **understands** images/videos.	Technique to **enhance/modify** images.
Used for object detection, facial recognition, self-driving cars.	Used for noise removal, filtering, resizing.
Focuses on **high-level interpretation**.	Focuses on **low-level pixel operations**.

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