रोल नं.
Roll No.

| 7 | 2 | 7 | 0 | 3 | 8 | 6 | 6 |

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

नोट

(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **23** हैं ।

(II) कृपया जाँच कर लें कि इस प्रश्न-पत्र में **21** प्रश्न हैं ।

(III) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।

(IV) **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें ।**

(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।

NOTE

(I) Please check that this question paper contains **23** printed pages.

(II) Please check that this question paper contains **21** questions.

(III) Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

(IV) **Please write down the serial number of the question in the answer-book at the given place before attempting it.**

(V) 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

कृत्रिम बुद्धिमत्ता
ARTIFICIAL INTELLIGENCE

निर्धारित समय : *2 घण्टे*
Time allowed : 2 hours

अधिकतम अंक : **50**
Maximum Marks : 50

General Instructions :

Section – A
(Objective Type Questions)

1. Answer any **4** out of the given **6** questions on employability skills : $4 \times 1 = 4$

   (i) Which of the following does not help in stress management ?

     (A) Healthy food   (B) Sound sleep

     (C) Yoga asanas   (D) Negative thoughts

   (ii) Spam refers to

     (A) Unnecessary images   (B) Temporary files

     (C) Junk mails   (D) Music files

   (iii) **Assertion (A) :** Sustainable agriculture is environment friendly.

     Reason (R)   : It prevents use of chemical fertilizers to protect soil.

     (A) Both (A) and (R) are correct and (R) is the correct explanation of (A).

     (B) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

     (C) (A) is correct but (R) is not correct.

     (D) (A) is not correct but (R) is correct.

(iv) Which of the following is not a step to build self-motivation ?

(A) Focusing on your goal.

(B) Planning to achieve your goal.

(C) Being indisciplined.

(D) Finding out your strength.

(v) Which of the following types of communication takes place when the number of people is small enough to communicate with each other effectively ?

(A) Interpersonal communication

(B) Public communication

(C) Intrapersonal communication

(D) Small group communication

(vi) Reema has started her own restaurant. She keeps on trying new ideas to make different dishes for her customers. As an entrepreneur, Reema is :

(A) Impatient   (B) Creative

(C) Under-confident   (D) Lazy

2. Answer any **5** out of the given **6** questions :   **5 × 1 = 5**

(i) **Assertion (A)** : When a machine is able to mimic human traits, it is said to be artificially intelligent.

   Reason (R) : A fully automatic washing machine is artificially intelligent.

(A) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(B) Both (A) and (R) are correct and (R) is not the correct explanation of (A).

(C) (A) is correct but (R) is not correct.

(D) (A) is not correct but (R) is correct.

(ii) Platforms such as Spotify, Facebook, Instagram, Amazon, Netflix etc. shows recommendation on the basis of what you like. Which is the technology behind this ?

    (A) Human Intelligence   (B) Platform Intelligence

    (C) Artificial Intelligence   (D) Application Intelligence

(iii) **Statement 1** : In "When" block of 4Ws canvas we find the stakeholders.

    Statement 2 : Stakeholders are the people who face a particular problem and would be benefitted with the solution.

    (A) Both Statement 1 and Statement 2 are correct.

    (B) Both Statement 1 and Statement 2 are incorrect.

    (C) Statement 1 is correct but Statement 2 is incorrect.

    (D) Statement 2 is correct but Statement 1 is incorrect.

(iv) Whenever we want an AI project to be able to predict an output, we need to _____.

    (A) first test it using the data.

    (B) first train it using the data.

    (C) Both (A) and (B)

    (D) Neither (A) nor (B)

(v) What does the term "image processing" refer to in Computer Vision ?

    (A) Editing videos

    (B) Extracting meaningful information from images

    (C) Playing audio files

    (D) Compiling codes

(vi) A corpus contains 4 documents in which the words such as 'an, is, the' were appearing frequently. Identify the term that is used for such words.

(A) Stop word (B) Rare word

(C) Missing word (D) Removable word

3. Answer any **5** out of the given **6** questions : $5 \times 1 = 5$

(i) Identify the logo of an application of AI given below. It helps us to navigate to places.

(ii) Which of the following data science application is not associated with genetics and genomics ?

(A) To understand the impact of DNA on health.

(B) To analyze reactions to drugs and disease.

(C) To find individual biological connection.

(D) To search the house address of a relative on the Internet.

(iii) In Computer Vision, which of the following tasks is used for single object ?

(A) Object Detection (B) Classification + Localization

(C) Instance Segmentation (D) Non-Localization

(iv) It is a domain-specific language that is designed for managing data held in different kinds of DBMS (Database Management System). It is particularly useful in handling structured data. Which computer language is this ?

(A) SQL (B) CSV

(C) Spreadsheet (D) TXT

(v) Which application of NLP helps to provide an overview of a news item or blog post ? It also avoids redundancy from multiple sources and maximises the diversity of content obtained.

   (A) Virtual Assistants

   (B) Sentiment Analysis

   (C) Text Classification

   (D) Automatic Summarization

(vi) Which condition of evaluation does the following diagram indicate ?

| Prediction : No | Reality : Yes |

   (A) False Positive

   (B) False Negative

   (C) True Positive

   (D) True Negative

4. Answer any **5** out of the given **6** questions : $5 \times 1 = 5$

   (i) Which of the following is the correct expansion of CSV ?

      (A) Comma and Space Value

      (B) Comma Separated Values

      (C) Control Separated Values

      (D) Character Separated Values

   (ii) **Statement 1** : Overfitting is not recommended for evaluation of a model.

      Statement 2 : This is because the model will simply remember the whole training set, and will therefore always predict the correct label for any point in the training set.
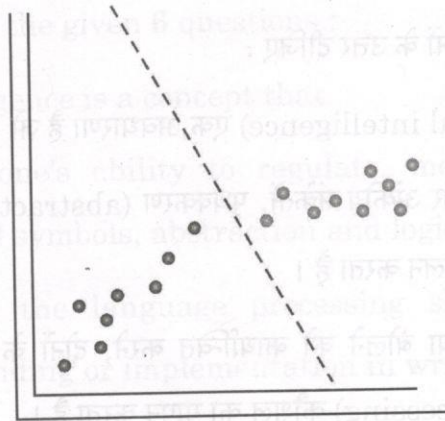
      (A) Both Statement 1 and Statement 2 are correct.

      (B) Both Statement 1 and Statement 2 are incorrect.

      (C) Statement 1 is correct but Statement 2 is incorrect.

      (D) Statement 2 is correct but Statement 1 is incorrect.

(iii) It is one of the parameters for evaluating a model's performance and is defined as the percentage of true positive cases versus all the cases where the prediction is true.

Which of the following evaluation parameter is this ?

(A) Precision   (B) Recall

(C) F1 score   (D) Accuracy

(iv) Which form of learning-based approach does the following diagram indicate ?

(A) Clustering

(B) Classification

(C) Regression

(D) Dimensionally Reduction

(v) Which of the following applications of NLP (Natural Language Processing) is associated with spam filtering in e-mails ?

(A) Virtual Assistants

(B) Sentiment Analysis

(C) Text Classification

(D) Automatic Summarization

(vi) Raghav can turn on and off any appliance remotely using an internet enabled device. This is an example of _____.

    (A) Artificial Intelligence (AI)

    (B) Internet of Things (IoT)

    (C) Computer Vision (CV)

    (D) Deep Learning (DL)

5. Answer any **5** out of the given **6** questions :   **5 × 1 = 5**

   (i) Musical intelligence is a concept that

    (A) assesses one's ability to regulate, measure and understand numerical symbols, abstraction and logic.

    (B) measures the language processing skills both in terms of understanding or implementation in writing or verbally.

    (C) evaluates the ability to process information on the environment around us.

    (D) describes a person's ability to recognize and create sounds, rhythms and sound patterns.

   (ii) With respect to evaluation, for which of the following does the prediction and reality match ?

    (A) True positive and False positive

    (B) True positive and True negative

    (C) False positive and False negative.

    (D) True positive and False negative

(iii) **Statement 1** : Various search engines and e-commerce portals now have a new feature called image-based search using computer vision.

Statement 2 : Image-based search helps in finding items, people and places by giving their sounds to the system.

(A) Both Statement 1 and Statement 2 are correct.

(B) Both Statement 1 and Statement 2 are incorrect.

(C) Statement 1 is correct but Statement 2 is incorrect.

(D) Statement 2 is correct but Statement 1 is incorrect.

(iv) In the context of NLP, which of the following words represents a stem resulting from stemming for "Studies" ?

(A) Study   (B) Stud

(C) Studi   (D) Studied

(v) Which of the following scenarios might have a high False Negative (FN) cost ?

(A) Viral Disease Outbreak

(B) Spam

(C) Mining

(D) Image Search

(vi) Which type of chat-bot has a wide functionality, is flexible and powerful, and works on bigger databases directly ?

Section – B

(Subjective Type Questions)

Answer any **3** out of the given **5** questions on Employability Skills. Answer each question in **20-30** words. $3 \times 2 = 6$

6. Explain the importance of following a healthy lifestyle in effectively dealing with stress. Write any one common factor that causes stress among the children nowadays.

7. If you are a team leader of a team of 20 people in an organization, mention any two methods that you will use for effective communication with your team members.

8. Write any two tasks that entrepreneurs do when they run their business.

9. Enlist any two measures that an individual should follow to take care of his/her digital devices.

10. Discuss the following problems related to sustainable development :

    (i) Water

    (ii) Fuel

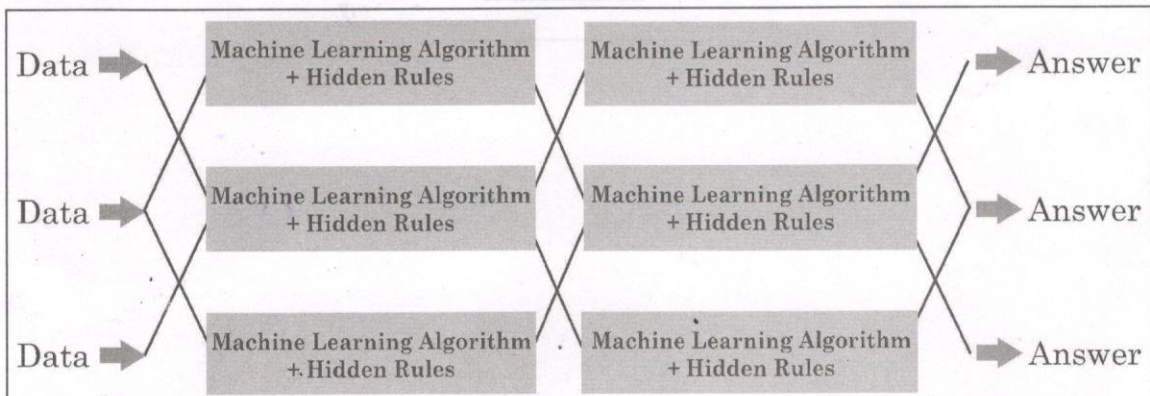Answer any **4** out of the given **6** questions in **20-30** words each. $4 \times 2 = 8$

11. Differentiate between Computer Vision (CV) and Natural Language Processing (NLP).

12. Define the following with respect to AI project cycle :

    (i) Data Exploration

    (ii) Data Features

13. One of the applications of Data Science is Airline Route Planning. List any two tasks that airline companies can do using Data Science.

14. Give any two key impacts of Computer Vision on medical imaging.

15. What is the primary difference between Human Language and Computer Language ?

16. Suppose you are developing an AI model to detect fraudulent financial transaction risk. Describe False Positives and False Negatives in this context.

Answer any **3** out of the given **5** questions in **50-80** words each.   **3 × 4 = 12**

17. What do you understand by AI Bias and AI Access ? Give one example of each to support your answer.

18. What is the use of problem statement template with respect to 4Ws of problem scoping ? Draw a problem statement template depicting all key elements.

19. Consider the following diagram. It explains how a system of organized machine learning algorithms perform certain tasks. Identify the concept and explain its working.

20. Consider the following documents :

Document 1 : NLP is a domain of AI.

Document 2 : NLP stands for Natural Language Processing.

Implement all the four steps of Bag of Words (BoW) model to create a document vector table.

21. An AI model has been developed to test specimens of blood/urine/cough etc. to diagnose ailments (diabetes/liver infection etc.). The model was tested on a data-set of about 630 tests and the resulting confusion matrix is as follows :

Confusion Matrix		Reality	
		Yes	No
Prediction	Yes	110	60
	No	50	410

(A) How many total cases are True Negative in the above scenario ?

(B) Calculate Precision, Recall and F1 Score.

_____