

Series 7DFEG

SET-4



प्रश्न-पत्र कोड  
Q.P. Code **104**

रोल नं.

Roll No.

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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.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 23 हैं।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 21 प्रश्न हैं।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें।
- 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।
- Please check that this question paper contains 23 printed pages.
- 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.
- Please check that this question paper contains 21 questions.
- Please write down the serial number of the question in the answer-book at the given place before attempting it.
- 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.

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## कृत्रिम बुद्धिमत्ता ARTIFICIAL INTELLIGENCE



निर्धारित समय : 2 घण्टे

Time allowed : 2 hours

अधिकतम अंक : 50

Maximum Marks : 50

104

5026

1

P.T.O.

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**General Instructions :**

- (i) *Please read the instructions carefully.*
- (ii) *This Question Paper consists of **21** questions in **two** sections : **Section-A** & **Section-B**.*
- (iii) ***Section-A** has Objective Type Questions, whereas **Section-B** contains Subjective Type Questions.*
- (iv) *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.*
- (v) *All questions of a particular section must be attempted in the correct order.*
- (vi) **Section-A : Objective Type Questions (24 Marks) :**
  - (a) *This section has **05** questions.*
  - (b) *Marks allotted are mentioned against each question/part.*
  - (c) *There is no negative marking.*
  - (d) *Do as per the instructions given.*
- (vii) **Section-B : Subjective Type Questions (26 Marks) :**
  - (a) *This section has **16** questions.*
  - (b) *A candidate has to do **10** questions.*
  - (c) *Do as per the instructions given.*
  - (d) *Marks allotted are mentioned against each question/part.*

**Section – A****(Objective Type Questions)**

1. Answer any 4 out of the given 6 questions on Employability Skills. **4 × 1 = 4**
- (i) What is the first step in goal setting ? **1**
- (A) Take feedback
- (B) Find strengths
- (C) Set a SMART goal
- (D) Discuss with your friend

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- (ii) Which statement shows all five main elements of the communication cycle ? 1
- (A) A person is thinking before speaking.  
(B) A person is writing a letter but not sending.  
(C) A customer is asking a question and the cashier responding.  
(D) A teacher is preparing lesson notes.
- (iii) Pawan runs a tea shop in a city cinema hall. His friend suggested him to use clay pots or kulhads instead of paper or plastic cups. With respect to sustainable development, which of the following statement is NOT an advantage of using kulhads ? 1
- (A) Reduction in cutting of trees for making paper cups.  
(B) Job creation for potters  
(C) Increase in use of fuel for making tea  
(D) Reduction in plastic waste
- (iv) Which of the following is primarily a Mobile Operating System ? 1
- (A) Microsoft Windows (B) Ubuntu  
(C) Mac OS (D) Google Android
- (v) Seema bakes cakes. Her customer comes to her bakery and starts shouting at her for late delivery. She does not get angry and listens to her customer. She is \_\_\_\_\_. 1
- (A) hard worker (B) confident  
(C) fearful (D) patient
- (vi) How many Sustainable Development Goals are given by the United Nations ? 1
- (A) 19 (B) 18  
(C) 17 (D) 10

2. Answer any 5 out of the given 6 questions.

5 × 1 = 5

(i) Analyze how Computer Vision technology has revolutionized the automotive industry, particularly in autonomous vehicles. What is the primary function it serves ? 1

(A) Managing fuel efficiency and engine performance.

(B) Controlling audio and entertainment systems.

(C) Identifying objects, navigation routes, and environment monitoring for safe autonomous driving.

(D) Handling vehicle maintenance scheduling.

(ii) You are developing a chatbot for a university admission system. The bot should understand queries like “What are the admission requirements ?” and “When is the deadline ?”. Which NLP stages would be most critical for this application ? 1

(A) Only Lexical Analysis

(B) Lexical and Syntactic Analysis

(C) All stages from Lexical to Pragmatic Analysis

(D) Only Semantic Analysis

(iii) Which of the following is NOT a principle of bioethics ? 1

(A) Respect for Autonomy

(B) Do not harm anyone

(C) Ensure maximum benefit for all

(D) Maximize profit

(iv) A spam e-mail detection system correctly identifies an e-mail as “Not Spam” when it actually is not spam. This represents : 1

(A) True Positive (TP)

(B) True Negative (TN)

(C) False Positive (FP)

(D) False Negative (FN)

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- (v) Artificial Neural Networks are inspired by : 1
- (A) Computer circuits
- (B) Mathematical equations
- (C) Human brain and nervous system
- (D) Internet networks
- (vi) **Assertion (A)** : Frameworks serve as a common language for communication and collaboration. 1
- Reason (R)** : Frameworks do not facilitate sharing of best practices. 1
- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
- (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (C) (A) is true, but (R) is false.
- (D) (A) is false, but (R) is true.

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

- (i) Which of the following best describes overfitting in the context of train-test split ? 1
- (A) The model performs well on both training and test data.
- (B) The model performs well on training data but poorly on test data.
- (C) The model performs poorly on both training and test data.
- (D) The model performs poorly on training data but well on test data.
- (ii) In a  $1280 \times 1024$  monitor resolution, what does this specification indicate ? 1
- (A) The monitor can display 1280 colours with 1024 brightness levels.
- (B) There are 1280 pixels horizontally and 1024 pixels vertically.
- (C) The monitor weighs 1280 grams and is 1024 mm wide.
- (D) The refresh rate is 1280 Hz with 1024 frames per second.

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- (iii) In unsupervised learning, the machine's primary task is to : 1
- (A) Predict specific outputs.
  - (B) Identify patterns and relationships in unlabelled data.
  - (C) Classify data into pre-defined categories.
  - (D) Learn from rewards only.
- (iv) Surveillance systems using Computer Vision can : 1
- (A) Translate spoken languages.
  - (B) Detect suspicious activities and track individuals.
  - (C) Analyze text documents.
  - (D) Process financial transactions.
- (v) **Assertion (A)** : Sentiment analysis can help businesses improve customer service.
- Reason (R)** : It automatically detects emotions when customers interact with products or services. 1
- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).
  - (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
  - (C) (A) is true, but (R) is false.
  - (D) (A) is false, but (R) is true.
- (vi) A music streaming service groups songs by tempo and intensity to understand user preferences. This is an example of : 1
- (A) Supervised learning – Classification
  - (B) Unsupervised learning – Clustering
  - (C) Reinforcement learning
  - (D) Supervised learning – Regression

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4. Answer any 5 out of the given 6 questions.

5 × 1 = 5

- (i) Recall is a classification metrics that measures : 1
- (A) How many False positives are correctly identified by the model.
  - (B) How many actual positive cases were correctly identified by the model.
  - (C) How many negative cases were correctly identified by the model.
  - (D) The overall accuracy of the model.
- (ii) In agricultural monitoring using Computer Vision, drones with cameras are used to : 1
- (A) Communicate with farmers.
  - (B) Translate farming manuals.
  - (C) Capture aerial images for crop health assessment.
  - (D) Calculate crop prices.
- (iii) A company wants to detect manufacturing defects where examples of both normal and defective products are available. They should use : 1
- (A) Unsupervised learning
  - (B) Reinforcement learning
  - (C) Association rules
  - (D) Supervised learning
- (iv) State True or False :  
With respect to Computer Vision, the **Classification + Localisation** task can only be used for single objects. 1
- (v) What is the primary purpose of train-test split in model evaluation ? 1
- (A) To increase the size of the dataset.
  - (B) To reduce computational complexity.
  - (C) To estimate the performance of the machine learning model on new data.
  - (D) To improve the accuracy of the training process.

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- (vi) With reference to text normalization, which of the following is NOT an example of a Stop Word ? 1
- (A) into  
(B) as  
(C) \$  
(D) healed

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

- (i) The deployment stage of the AI Project Cycle is crucial for : 1
- (A) Collecting initial data.  
(B) Training the model.  
(C) Ensuring successful integration in real-world environment.  
(D) Exploring data patterns.
- (ii) The sentence “hot ice cream” would be rejected at which stage of NLP processing ? 1
- (A) Lexical Analysis  
(B) Syntactic Analysis  
(C) Semantic Analysis  
(D) Discourse Integration
- (iii) **Assertion (A)** : Computer Vision enables AI to see, observe and make sense of visual data like images and videos.  
**Reason (R)** : Computer Vision works independently without requiring artificial intelligence algorithms. 1
- (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).  
(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).  
(C) (A) is true, but (R) is false.  
(D) (A) is false, but (R) is true.

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- (iv) This ethical concern refers to an honest explanation how the chosen evaluation metrics work and produce results without keeping any information hidden. Name this ethical concern that should be kept in mind while evaluating an AI model. 1
- (A) Bias  
(B) Transparency  
(C) Accountability  
(D) Accuracy
- (v) Which NLP application would be most useful for a hearing-impaired person watching a live news broadcast ? 1
- (A) Language translation  
(B) Voice assistants  
(C) Auto-generated captions  
(D) Sentiment analysis
- (vi) Which of the following best describes model evaluation in artificial intelligence ? 1
- (A) The process of creating new datasets for training  
(B) The process of using different evaluation metrics to understand a machine learning model's performance  
(C) The process of selecting algorithms for model building  
(D) The process of data preprocessing and cleaning

**Section – B**  
**(Subjective Type Questions)**

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

6. Write any one communication barrier and suggest one way to overcome it. 2

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7. Rajan has the habit of keeping his device plugged in even if it is fully charged.

Is this habit advisable for good maintenance of the device ? Yes or No.

Justify your answer with explanation. 2

8. Write any two misconceptions about entrepreneurship. 2

9. List the four steps for effective time management. 2

10. For sustainable development, we have to become responsible consumers and producers. List any four ways that will help us become responsible. 2

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

11. Differentiate between Statistical Data and Computer Vision domains of AI with one example each. 2

12. Give any two characteristics of Artificial Neural Networks. 2

13. With reference to Computer Vision, define the following terms : 2

(a) Pixel

(b) Instance Segmentation

14. Provide one real-world application each of Supervised Learning and Unsupervised Learning. 2

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15. Define Accuracy. Also give one example to explain why high accuracy does not always mean a model is performing well in real-world situations. 2

16. With reference to NLP, list the first four steps involved in text normalization. 2

Answer any 3 out of the given 5 questions in 50-80 words each.  $3 \times 4 = 12$

17. (a) Differentiate between Classification Model and Regression Model. 4

(b) Study the following real-world applications and identify whether each represents a Classification Model or a Regression Model :

(i) Predicting a patient's blood pressure reading will be 120/80 mmHg based on age, weight, and lifestyle factors.

(ii) Forecasting that 2,847 units of a product will be sold next month based on past sales data and market trends.

(iii) Determining if a patient has "diabetes" or "no diabetes" based on glucose levels and other medical parameters.

(iv) Predicting that a company's share price will be ₹ 1,250.75 tomorrow based on market indicators and company performance.

18. A smart city project wants to implement an integrated AI system. For each of the following requirements, identify the most appropriate AI domain and justify your choice : 4

(a) Analyzing traffic camera footage to count vehicles and detect traffic violations automatically.

(b) Processing citizen complaints written in local languages to categorize them as "water supply", "electricity", or "waste management" issues.

19. An AI model has been developed to predict whether electric vehicle batteries need replacement based on performance data. The model was tested on a dataset of 700 vehicles and the resulting confusion matrix is as follows :

4

| Confusion Matrix |     | Reality |    |
|------------------|-----|---------|----|
|                  |     | Yes     | No |
| Prediction       | Yes | 590     | 20 |
|                  | No  | 10      | 80 |

The above Confusion Matrix can also be represented as follows :

|               |   | Predicted Values |    |
|---------------|---|------------------|----|
| Actual Values |   | 1                | 0  |
|               | 1 | 590              | 10 |
|               | 0 | 20               | 80 |

- (a) How many total cases are False Positives in the above scenario ?
- (b) Calculate Precision, Recall and F1 Score.
20. (a) Explain Reinforcement Learning with an example.
- (b) A drawback of Rule Based Approach is that learning is static. Explain the given statement.

4

21. Consider the following documents :

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**Document 1 :** AI helps humans daily.

**Document 2 :** Humans use AI technology.

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