

Series : EFGH/S



SET~4

रोल नं.
Roll No.



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प्रश्न-पत्र कोड
Q.P. Code **104/S**

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.

NOTE

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| <p>(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 23 हैं।</p> <p>(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।</p> <p>(III) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 21 प्रश्न हैं।</p> <p>(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें।</p> <p>(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।</p> <p style="text-align: center;">#
• • •</p> | <p>(I) Please check that this question paper contains 23 printed pages.</p> <p>(II) 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.</p> <p>(III) Please check that this question paper contains 21 questions.</p> <p>(IV) Please write down the Serial Number of the question in the answer-book at the given place before attempting it.</p> <p>(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.</p> |
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कृत्रिम बुद्धिमत्ता



ARTIFICIAL INTELLIGENCE

निर्धारित समय : 2 घण्टे

अधिकतम अंक : 50

Time allowed : 2 hours

Maximum Marks : 50



General Instructions :

- (i) Please read the instructions carefully.
- (ii) This question paper consists of **21** questions in **two** Sections : **Section A** and **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 **5** questions.
 - (b) There is no negative marking.
 - (c) Do as per the instructions given.
 - (d) Marks allotted are mentioned against each question / part.
- (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) (24 Marks)

1. Answer any **4** out of the given **6** questions on Employability Skills. $4 \times 1 = 4$
- (i) Mani has her final exam coming up. She creates a study schedule and sticks to it, balancing her study time with short breaks. Which self-management skill is she demonstrating ?
 - (A) Emotional Intelligence
 - (B) Managing Emotions
 - (C) Stress management
 - (D) Time management



- (ii) Which of the following is a common misconception about entrepreneurship ?
- (A) Entrepreneurs are not always successful on their first attempt.
 - (B) Its not required to have extensive industry experience to become entrepreneurs.
 - (C) Starting a business requires a large amount of initial capital.
 - (D) Entrepreneurs may need to collaborate with others.
- (iii) Which file extension is commonly used for image files ?
- (A) .txt
 - (B) .exe
 - (C) .jpg
 - (D) .mp3
- (iv) Which of the following is an example of verbal communication ?
- (A) Gestures
 - (B) Facial expressions
 - (C) Written letters
 - (D) Posture
- (v) What does the abbreviation “SMART” commonly stand for in the context of goal-setting ?
- (A) Superior, Motivated, Analytical, Resourceful, Timely
 - (B) Specific, Measurable, Achievable, Realistic, Time-bound
 - (C) Speedy, Manageable, Accurate, Realistic, Tangible
 - (D) Successful, Methodical, Adaptable, Reliable, Thorough



(vi) *Assertion (A)* : Green skills are essential for sustainable development.

Reason (R) : They help in reducing environmental impact and promote eco-friendly practices.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

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

5×1=5

(i) _____ enables computers to mimic human intelligence.

- (A) Cloud Computing
- (B) Artificial Intelligence
- (C) Web Development
- (D) Data Entry

(ii) Which AI application involves analysing large sets of data to extract meaningful insights for decision-making ?

- (A) Computer Vision
- (B) Robotics
- (C) Natural Language Processing (NLP)
- (D) Data Science

(iii) State True/False :

Machine learning and Deep learning are part of Artificial Intelligence, but not everything that is Machine learning will be Deep learning.

(iv) Which of the following words represents an example of stemming for “Sharing” ?

- | | |
|------------|------------|
| (A) Share | (B) Shared |
| (C) Shares | (D) Shar |



(v) Kinesthetic Intelligence :

- (A) Is the ability that is related to how a person uses his limbs in a skilled manner.
- (B) Assesses one's proficiency in mathematics and logical reasoning.
- (C) Describes the level of self-awareness someone has, starting from realising weaknesses, strengths, to recognising their own feelings.
- (D) The ability to perceive the visual world and the relationship of one object to another.

(vi) For Data Science, data is typically collected in tabular form and stored in various formats. Which of the following is commonly used for storing such tabular data sets ?

- (A) SQL databases
- (B) HTML files
- (C) JSON
- (D) NumPy

3. Answer any **5** out of the given **6** questions.

5×1=5

(i) Which of the following is the second stage of an AI Project Cycle ?

- (A) Problem Scoping
- (B) Evaluation
- (C) Data Acquisition
- (D) Data Exploration



- (ii) _____ is defined as the percentage of correct predictions out of all the observations.
- (A) Precision (B) Accuracy
(C) Recall (D) F1
- (iii) _____ is the best example of Robotics and AI (Artificial Intelligence) working together.
- (A) Telephones (B) Self-driving cars
(C) Bulb (D) Printing Machine
- (iv) Which computer vision task involves both identifying what object is present in an image and determining the precise location of that object within the image ?
- (A) Image Classification
(B) Object Detection
(C) Instance Segmentation
(D) Classification + Localisation
- (v) In a quality control system for manufacturing, which scenario represents a false negative ?
- (A) When a defective product is correctly identified as defective.
(B) When a non-defective product is inaccurately identified as defective.
(C) When a non-defective product is correctly identified as non-defective.
(D) When a defective product is mistakenly identified as non-defective.
- (vi) In the sentence “She reads the book”, which of the following is a stop-word that should be removed during text preprocessing ?
- (A) She (B) reads
(C) the (D) book



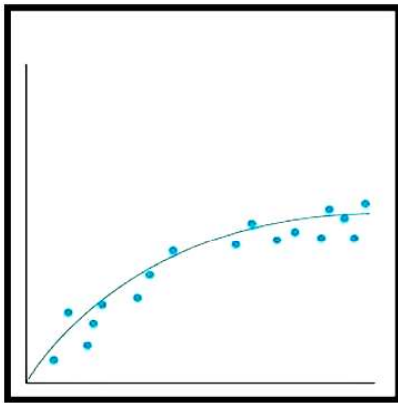
4. Answer any 5 out of the given 6 questions.

5×1=5

(i) In Natural Language Processing (NLP), _____ occur/s very frequently in the corpus but do/does not add any value to it.

- (A) Text Normalisation
- (B) Stop words
- (C) Start words
- (D) Tokenisation

(ii) The following diagram indicates :



- (A) Classification
 - (B) Regression
 - (C) Reinforcement learning
 - (D) Clustering
- (iii) When a model is evaluated on the training data it always predicts correctly. This is known as _____.
- (iv) The first step of Bag of Words algorithm is Text Normalisation. Which of the following task is done in this step ?
- (A) Creating document vectors
 - (B) Collecting and pre-processing data
 - (C) Adding the words to a dictionary
 - (D) Creating a vector of words



- (v) Which of the following is **not** true about Confusion Matrix ?
- (A) It allows us to understand prediction results.
 - (B) It is a Model Training Matrix.
 - (C) It helps in evaluation of machine learning models.
 - (D) It is used to record comparison between prediction and reality.
- (vi) Name any two search engines.

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

5×1=5

- (i) Sentiment analysis of customer reviews on various online stores is an example of _____.
- (A) Machine Learning
 - (B) Computer Vision
 - (C) Natural Language Processing (NLP)
 - (D) Speech Recognition
- (ii) In a neural network, what is the function of the input layer ?
- (A) It performs mathematical operations on the input data.
 - (B) It connects neurons to the output layer for predictions.
 - (C) It receives and passes the raw input data to the hidden layers.
 - (D) It stores weights and biases for neural network training.
- (iii) The Face Filter feature in Instagram is an application of _____.
- (A) NLP
 - (B) Computer Vision
 - (C) Data Science
 - (D) Blockchain Technology



- (iv) Which of the following statements is true about AI Bias ?
- (A) It is always negative.
 - (B) It leads to overfitting of training data.
 - (C) It can result in unfair and discriminatory outcomes.
 - (D) A machine can have biases of its own.
- (v) In a medical screening test for a specific disease, which scenario represents a True Negative ?
- (A) A person without the disease tests positive for the disease.
 - (B) A person with the disease tests positive for the disease.
 - (C) A person with the disease tests negative for the disease.
 - (D) A person without the disease tests negative for the disease.
- (vi) *Assertion (A)* : The less pixels you have, the better is the image quality.
- Reason (R)* : Resolution refers to the number of pixels per unit of area in an image, determining its clarity and detail.
- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 - (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).
 - (C) Assertion (A) is true, but Reason (R) is false.
 - (D) Assertion (A) is false, but Reason (R) is true.



Section B
(Subjective Type Questions)

(26 marks)

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

6. Define sustainable development. Write any two problems related to sustainable development.
7. Name and discuss any two elements of a communication cycle.
8. Differentiate between wage employed people and self-employed people.
9. Explain the effectiveness of physical exercise and fresh air in stress management.
10. Define the following terms :
 - (a) Firewall
 - (b) Worms

Answer any **4** out of the given **6** questions in 20 – 30 words each. 4×2=8

11. Differentiate between Kinesthetic Intelligence and Spatial Visual Intelligence.
12. Differentiate between Script-bot and Smart-bot.
13. Differentiate between Data Acquisition and Data Exploration.
14. Give names of any two online and any two offline sources of data.



15. Draw the confusion matrix for the following data :

- (a) The number of true positive = 200
- (b) The number of true negative = 50
- (c) The number of false positive = 35
- (d) The number of false negative = 55

16. Name the tasks used in Computer Vision applications for :

- (a) Single objects
- (b) Multiple objects

Answer any **3** out of the given **5** questions in **50 – 80** words each.

3×4=12

17. With respect to scoping a problem in AI Project Cycle, explain 4 Ws Problem Canvas in detail.

18. Explain the following with respect to Unsupervised Learning Models :

- (a) Clustering
- (b) Dimensionality Reduction

19. You have two documents :

Document 1 : CV is an upcoming field.

Document 2 : Image Feature is an important part of CV.

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



20. Categorise the following examples under the given three AI domains – Data Science, NLP and Computer Vision with justification :

- (a) Recommendation Websites
- (b) Voice-based Virtual Assistants
- (c) Spam Filters
- (d) Airline Route Planning

21. A sentiment analysis model was built to classify movie reviews as either 'Positive' or 'Negative'. The model was tested on a dataset of 500 reviews, resulting in the following confusion matrix :

Confusion Matrix		Reality	
		Yes	No
Predicted	Yes	300	40
	No	60	100

- (a) How many total cases are True Positive in the above scenario ?
- (b) Calculate Precision, Recall and F1-Score.

