Series : 2KNLM

Set – 4

रोल नं.
Roll No.

प्रश्न-पत्र कोड
Q.P. Code **104**

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.

कृत्रिम बुद्धिमत्ता {}

ARTIFICIAL INTELLIGENCE

निर्धारित समय : 2 घण्टे *अधिकतम अंक : 50*
Time allowed : 2 hours *Maximum Marks : 50*

- 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.

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 **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)

1. Answer any **4** out of the given **6** questions on Employability skills : **4 × 1 = 4**

(i) Identify the imperative sentence : **1**

(A) Shut the front door. (B) She is talented artist.

(C) Are you feeling better ? (D) You were amazing !

(ii) Breaking down big goals into smaller parts will make the goal _____. **1**

(A) specific (B) measurable

(C) achievable (D) realistic

(iii) Define the term 'Time Management'. **1**

(iv) What should a strong password consist of ? **1**

(A) Only letters

(B) Numbers and special characters

(C) Name of a person

(D) Letters, numbers and special characters

(v) A misconception about an entrepreneur is : **1**

Entrepreneurs are _____, not _____.

(vi) Choose the option which is NOT a Sustainable Development Goal according to United Nations. **1**

(A) Population (B) No poverty

(C) Quality education (D) Reduced Inequalities

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

(i) Anita and Surjit are creating an AI application that will classify different types of fruits. The Computer Vision task that will identify the type of fruit and assign a label to it is called _____. **1**

(A) Segmentation

(B) Classification

(C) Classification + Localization

(D) Object Detection

(ii) Consider the following sentence : **1**

On seeing her son's result, Pooja's face turned red with anger.

The word "red" demonstrates which characteristic of natural language ?

(A) Redundancy

(B) Context-dependent meaning

(C) Grammatical structure

(D) Temporal change

(iii) Ethical frameworks are primarily designed to : **1**

(A) Increase the efficiency of AI algorithms.

(B) Ensure that choices made do not cause unintended harm.

(C) Reduce the cost of AI development.

(D) Speed up the AI project cycle.

(iv) **Statement 1 :** Overfitting occurs when a model memorizes the training data rather than learning patterns.

Statement 2 : Using the same data for training and evaluation helps the model give accurate results. **1**

(A) Both statements are correct.

(B) Both statements are incorrect.

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

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

(v) Which learning approach would be most suitable for training an AI model to park the car correctly ? **1**

(A) Supervised Learning (B) Unsupervised Learning

(C) Transfer Learning (D) Reinforcement Learning

(vi) Which stage of the AI Project Cycle involves testing the model on newly fetched data ? **1**

(A) Data Exploration (B) Modelling

(C) Evaluation (D) Deployment

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

(i) In the context of autonomous vehicle safety systems, which type of error would be most critical to minimize ? **1**

(A) False Positive (detecting danger when there isn't any)

(B) False Negative (failing to detect actual danger)

(C) True Positive (detecting danger correctly)

(D) True Negative (correctly identifying that there is no danger)

(ii) What is the range of possible pixel values in a byte image format ? **1**

(A) 0 to 100 (B) 0 to 255

(C) 1 to 256 (D) –128 to 127

(iii) An e-commerce platform analyzes customer purchase patterns to recommend "Customers who bought product **X** also bought product **Y**." This uses : **1**

(A) Classification model

(B) Regression model

(C) Association model

(D) Clustering model

(iv) As AI is essentially being used as a decision making / influencing tool, we need to ensure that AI makes morally acceptable recommendations. Which of the following is a key factor that can knowingly or unknowingly influences our decision-making while designing an AI model ? **1**

(A) Intuition and Values (B) Algorithm efficiency

(C) Data storage capacity (D) Processing speed

(v) Which NLP application helps in converting natural speech into text in real time ? **1**

(A) Keyword Extraction tool

(B) Translation of books from English to Hindi language

(C) Auto generated captions on YouTube

(D) Classifying raw text into pre-defined groups

(vi) In supervised learning, what is the purpose of the testing dataset ? **1**

(A) To train the model.

(B) To evaluate the model's accuracy.

(C) To create new features.

(D) To label the data.

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

(i) In a fire alarm system, if the model predicts "Fire Present" when there is actually no fire, this is classified as : **1**

(A) True Positive (TP) (B) True Negative (TN)

(C) False Positive (FP) (D) False Negative (FN)

(ii) **Assertion (A) :** Bioethics is an example of a Value-based Framework for AI.

Reason (R) : Bioethics deals with ethical issues related to health, medicine, and biological sciences. **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.

(iii) Which scenario best represents a regression problem ? **1**

(A) Identifying whether an email is spam.

(B) Grouping customers by behaviour.

(C) Predicting tomorrow's temperature.

(D) Recognizing faces in photos.

(iv) Which of the following best describes the relationship between pixels and image resolution ? **1**

(A) More pixels result in lower image quality.

(B) Pixels and resolution are unrelated concepts.

(C) Resolution depends only on image file size.

(D) The number of pixels in an image is known as resolution.

(v) Precision is defined as : **1**

(A) The ratio of correctly predicted positive observations to total observations.

(B) The ratio of correctly predicted positive observations to total predicted positive observations.

(C) The ratio of correctly predicted negative observations to total observations.

(D) The harmonic mean of true positives and true negatives.

(vi) Which type of chat bot requires coding and works on bigger databases directly ? **1**

(A) Script bot

(B) Smart bot

(C) Traditional bot

(D) Rule-based bot

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

(i) Which AI domain would be most suitable for developing a price comparison website ? **1**

(A) Computer Vision

(B) Natural Language Processing

(C) Statistical Data

(D) Robotics

(ii) **Assertion (A) :** Converting text to lowercase is preferable in text preprocessing.

Reason (R) : It ensures that "Hello" and "hello" are treated as the same word by the machine. **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.

(iii) In the context of Computer Vision vs Image Processing, which statement correctly differentiates them ? **1**

(A) Computer Vision and Image Processing are exactly the same.

(B) Computer Vision enhances the image while Image Processing does not.

(C) Computer Vision is a superset of Image Processing.

(D) Image Processing is a superset of Computer Vision.

(iv) State True or False : **1**

In machine learning, the error is used to see how accurately the model can predict data.

(v) A company wants to analyze customer reviews to understand satisfaction levels. Which NLP application would be most suitable ? **1**

(A) Text classification

(B) Sentiment analysis

(C) Keyword extraction

(D) Language translation

(vi) An AI model was tested with 1000 test samples. If True Positive (TP) = 200, True Negative (TN) = 600, False Positive (FP) = 100, False Negative (FN) = 100, how many total predictions were correct ? **1**

(A) 300 (B) 600

(C) 800 (D) 900

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 the 7 C's of communication. **2**

7. (a) What is emotional intelligence ?

   (b) Name any two skills included in emotional intelligence. **1 + 1 = 2**

8. How ICT skills help us in our day-to-day activities ? **2**

9. State the qualities to become a successful entrepreneur. **2**

10. Define the term 'Sustainable Development' **2**

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

11. Explain the difference between sector-based and value-based ethical frameworks with one example of each. **2**

12. Give any two characteristics of a Classification Model. **2**

13. How do computers store RGB images ? **2**

14. Give two differences between Supervised and Unsupervised learning. **2**

15. Explain Train-test split technique with respect to machine learning algorithm. **2**

16. How is Stemming different from Lemmatization ? Explain how the word "**Wolves**" would be processed by stemming and lemmatization. **2**

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

17. Differentiate between Deep Learning, Artificial Intelligence and Machine Learning. Also draw a labelled Venn diagram depicting the relationship between AI, ML and DL. **4**

18. Consider the following scenarios and identify which AI domain would be most appropriate for each, with justification : **4**

(A) An AI based education platform needs to translate to English language and analyze thousands of student essays to provide instant feedback on grammar, content quality and writing style.

(B) An AI based application installed on a busy crossing in a metropolitan city scans all vehicles driving through that crossing during peak traffic hours and categorizes them into four wheelers and two wheelers.

19. Read the following paragraph and answer the questions that follow :

PQR Security Solutions has designed an AI Model to detect cyber attacks on E-Commerce websites. For this, various network activities were monitored and analyzed on one of the websites. The model was tested on a dataset of 1500 network activities. Out of these, the model correctly predicted that 1000 were cyber attacks. It also correctly identified that 250 were not cyber attacks. However, the model predicted that 200 were cyber attacks but actually they were not. Additionally, it predicted that 50 were not cyber attacks but they actually were.

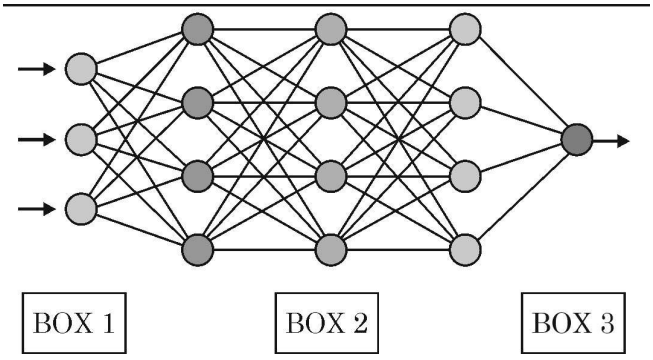
(A) Draw the confusion matrix based on the given scenario. **2**

(B) How many total cases are True Negative in the above scenario ? **1**

(C) Calculate Precision. **1**

20. (A) Expand and define the terms CNN and ANN. **3**

(B) In the diagram of neural network given below, identify the layer that should be depicted in Box 1 and Box 2 : **1**



21. Consider the following documents : **4**

Document 1 : Data Science requires information.

Document 2 : Information analysis requires data.

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