Sl. No.

A9.5-R5 : ARTIFICIAL INTELLIGENCE CONCEPTS AND R PROGRAMMING

अवधि : 03 घंटे **अधिकतम अंक : 100**
DURATION : 03 Hours **MAXIMUM MARKS : 100**

ओएमआर शीट सं. : **OMR Sheet No. :**						

रोल नं. : **Roll No. :** | | | | | | |

उत्तर-पुस्तिका सं. : **Answer Sheet No. :** | | | | | | |

परीक्षार्थी का नाम : **परीक्षार्थी के हस्ताक्षर :**
Name of Candidate : _____ **Signature of Candidate :** _____

परीक्षार्थियों के लिए निर्देश :	**Instructions for Candidate :**
कृपया प्रश्न-पुस्तिका, ओएमआर शीट एवं उत्तर-पुस्तिका में दिये गए निर्देशों को ध्यानपूर्वक पढ़ें।	Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet.
प्रश्न-पुस्तिका की भाषा अंग्रेजी है। परीक्षार्थी केवल अंग्रेजी भाषा में ही उत्तर दे सकता है।	Question Paper is in English language. Candidate can answer in English language only.
इस मॉड्यूल/पेपर के **दो भाग** हैं। **भाग एक** में **चार** प्रश्न और **भाग दो** में **पाँच** प्रश्न हैं।	There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
भाग एक ''वैकल्पिक'' प्रकार का है जिसके कुल अंक 40 है तथा **भाग दो** ''व्यक्तिपरक'' प्रकार का है और इसके कुल अंक 60 है।	**PART ONE** is Objective type and carries 40 Marks. **PART TWO** is Subjective type and carries 60 Marks.
भाग एक के उत्तर, **ओएमआर उत्तर-पुस्तिका** पर ही दिये जाने हैं। **भाग दो** की उत्तर-पुस्तिका में **भाग एक** के उत्तर **नहीं** दिये जाने चाहिए।	**PART ONE** is to be answered in the **OMR ANSWER SHEET** only. **PART ONE** is **NOT** to be answered in the answer book for **PART TWO**.
भाग एक के लिए अधिकतम समय सीमा **एक घण्टा** निर्धारित की गई है। **भाग दो** की उत्तर-पुस्तिका, **भाग एक** की उत्तर-पुस्तिका जमा कराने के पश्चात् दी जाएगी। तथापि, निर्धारित एक घंटे से पहले **भाग एक** पूरा करने वाले परीक्षार्थी **भाग एक** की उत्तर-पुस्तिका निरीक्षक को सौंपने के तुरंत बाद, **भाग दो** की उत्तर-पुस्तिका ले सकते हैं।	Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the Answer Sheet for **PART ONE** is returned. However, Candidates who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the Answer Sheet for **PART ONE** to the Invigilator.
परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना और अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हॉल/कमरा नहीं छोड़ सकते हैं। ऐसा नहीं करने पर, परीक्षार्थी को इस मॉड्यूल/पेपर में अयोग्य घोषित कर दिया जाएगा।	**Candidate cannot leave the examination hall/room without signing on the attendance sheet and handing over his/her Answer Sheet to the invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/Paper.**
प्रश्न-पुस्तिका को खोलने के निर्देश मिलने के पश्चात् एवं उत्तर लिखना आरम्भ करने से पहले उम्मीदवार जाँच कर यह सुनिश्चित कर लें कि प्रश्न-पुस्तिका प्रत्येक दृष्टि से संपूर्ण है।	After receiving the instruction to open the booklet and before starting to answer the questions, the candidate should ensure that the Question Booklet is complete in all respect.

जब तक आपसे कहा न जाए, तब तक प्रश्न-पुस्तिका न खोलें।
DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

PART ONE

(**Answer all the questions)**

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "OMR" answer sheet attached to the question paper, following instructions therein. **(1x10)**

1.1 The performance of an agent can be improved by :

(A) Learning

(B) Observing

(C) Perceiving

(D) None of the mentioned

1.2 External actions of the agent is selected by :

(A) Perceive

(B) Performance

(C) Learning

(D) Actuator

1.3 A.M. turing developed a technique for determining whether a computer could or could not demonstrate the artificial Intelligence, Presently, this technique is called :

(A) Turing Test

(B) Algorithm

(C) Boolean Algebra

(D) Logarithm

1.4 A natural language generation program must decide :

(A) what to say

(B) when to say something

(C) why it is being used

(D) both what to say & when to say something

1.5 Decision Tree algorithm is a type of :

(A) Supervised learning

(B) Unsupervised learning

(C) Active learning

(D) Reinforcement learning

1.6 The most convenient way to use R is at a graphics workstation running a _____ system.

(A) windowing

(B) running

(C) interfacing

(D) matrix

1.7 Elementary commands in R consist of either _____ or assignments.

(A) utilstats

(B) language

(C) expressions

(D) packages

1.8 If a command is not complete at the end of a line, R will give a different prompt, by default it is _____.

(A) *

(B) -

(C) +

(D) /

1.9 The operation of moving from finer-granularity data to a coarser granularity (by means of aggregation) is called a :

(A) Rollup

(B) Drill down

(C) Dicing

(D) Pivoting

1.10 Data that can be modeled as dimension attributes and measure attributes are called :

(A) Multidimensional data

(B) Single dimensional data

(C) Measured data

(D) Dimensional data

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "OMR" sheet attached to the question paper, following instructions therein. (1x10)

2.1 Heuristic is the term used for describing the judgmental or commonsense part of problem solving.

2.2 Agent-based systems can be seen as Artificial Intelligence with many interacting agents.

2.3 Data visualization cannot be done using R.

2.4 OLAP stands for Online Available Processing.

2.5 Clustering algorithms required labelled data for training.

2.6 Correlation is a statistical measure which determines co-relationship or association of two variables.

2.7 KNN is an eager learner classifier.

2.8 OLTP stands for Online Transactional Processing.

2.9 AI can be applied in finance sector.

2.10 Poisson distribution is a discrete probability distribution.

3. **Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the "OMR" answer sheet attached to the question paper, following instructions therein.** **(1x10)**

	X		Y
3.1	Confusion Matrix	**A.**	Data warehouse
3.2	Agent will choose its actions in order to achieve goals	**B.**	Semi structured data
3.3	Large collection of business data used to help an organization make decisions	**C.**	Application of AI
3.4	Self driving Car	**D.**	scatter plot
3.5	Clustering algorithm	**E.**	Accuracy
3.6	JSON data	**F.**	Poisson distribution
3.7	Relationship between two numerical variables	**G.**	cat()
3.8	a model for a series of discrete event	**H.**	Goal based agents
3.9	Print values of the variables in R	**I.**	K-means
3.10	Market Basket Analysis	**J.**	Vectors
		K.	Frequent pattern mining
		L.	Regression
		M.	show()

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the "OMR" answer sheet attached to the question paper, following instructions therein. (1x10)

A.	Regression	**B.**	Healthcare	**C.**	Normal Distribution
D.	KNN	**E.**	Artificial Intelligence	**F.**	R
G.	Histogram	**H.**	Data mart	**I.**	Hist ()
J.	Data Mining	**K.**	Activation	**L.**	Turing test
M.	Root Mean Squared Error				

4.1 _____ is the process of determining data patterns.

4.2 The _____ programming language is a free software environment for statistical computing and graphics.

4.3 Logistic regression uses _____ function.

4.4 Automation of activities we normally attribute to human thinking and rationality, such as problem-solving, decision-making, and learning is known as _____.

4.5 _____ is one of the applications of AI.

4.6 A _____ is a subset of data stored within the overall data warehouse, for the needs of a specific team, section or department within the enterprise.

4.7 _____ determines the strength of the relationship between one dependent variable and a series of other changing variables.

4.8 _____ function in used to draw histogram in R.

4.9 A _____ shows the underlying frequency distribution of a set of continuous data.

4.10 The _____ is the probability function that describes how the value of variable is distributed.

PART TWO

(Answer any FOUR questions)

5. (a) List the different types of agent-based systems.

(b) Write down the steps of K-Means algorithm.

(c) Write a R program to convert a given matrix to a 1 dimensional array. **(5+5+5)**

6. (a) What is statistical data analysis ? Mention the types of statistical analysis.

(b) Differentiate between Supervised learning and Unsupervised learning.

(c) Describe the structure of Agents. **(5+5+5)**

7. (a) Define Artificial Intelligence (AI) ? What is the need of AI ? Enlist and explain the various advantages of AI.

(b) Mention the applications where AI can be applied. Also explain any two applications in detail. **(8+7)**

8. (a) What is classification and regression in machine learning ? Mention different types of regression. Can regression be used for classification ?

(b) Explain what is R ? List out some of the functions that R provides. What are the data structures in R that is used to perform statistical analysis and create graphs ? **(8+7)**

9. Briefly explain the following (**Any three**) :

(a) Data mining and data warehouse.

(b) Confusion Matrix.

(c) Types of data (Structured, Unstructured and Semi-structured).

(d) Data Visualization with R. **(5+5+5)**

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SPACE FOR ROUGH WORK

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