A10.5-R5 : Machine Learning using Python

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 Candidates :**
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 अंग्रेजी भाषा में है। परीक्षार्थी उत्तर लिखने के लिए केवल अंग्रेजी भाषा का ही प्रयोग कर सकते हैं।	Question Paper is in English language. Candidate has to 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, इस प्रश्न-पत्र के साथ दी गई **ओएमआर उत्तर-पुस्तिका** पर, उसमें दिये गए अनुदेशों के अनुसार 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, supplied with the question paper, as per the instructions contained therein. **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 यह जाँच कर 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; each question carries ONE mark)

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

1.1. A perceptron is a

(A) Feed-forward neural network

(B) Backpropagation algorithm

(C) Backtracking algorithm

(D) Feed Forward-backward algorithm

1.2. Which of the following is a widely used and effective machine learning algorithm based on the idea of bagging ?

(A) Decision Tree

(B) Regression

(C) Classification

(D) Random Forest

1.3. What is the output of the following code :

```
L = ['a','b','c','d']
print "".join(L)
```

(A) Error

(B) None

(C) abcd

(D) ['a','b','c','d']

1.4. What is the purpose of performing cross-validation ?

(A) To assess the predictive performance of the models

(B) To judge how the trained model performs outside the sample on test data

(C) Both (A) and (B)

(D) None of the above

1.5. Which of the following is an example of feature extraction ?

(A) Constructing bag of words vector from an email

(B) Applying PCA projects to a large high-dimensional data

(C) Removing stop words in a sentence

(D) All of the above

1.6. Which module in Python supports regular expressions ?

(A) re

(B) regex

(C) pyregex

(D) None of the above

1.7. What does ~~~~~~5 evaluate to?

(A) +5

(B) +11

(C) -11

(D) -5

1.8. What data type is the object below ?

L = [1, 23, 'hello',1]

(A) List

(B) Dictionary

(C) Tuple

(D) Array

1.9. Which of the following is more accurate for the following declaration ?

x = Circle()

(A) Now you can assign int value to x

(B) x contains a reference to a Circle object

(C) x actually contains an object of type Circle

(D) x contains an int value

1.10. Which function can be used on the file to display a dialog for saving a file ?

(A) Filename = savefilename()

(B) Filename = asksavefilename()

(C) Fielname = asksaveasfilename()

(D) No such option in python

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

2.1. The range of SIGMOID function is [0,1].

2.2. Neural Networks are complex nonlinear functions with many parameters.

2.3. Adding a non-important feature to a linear regression model may result in decrease in R-square.

2.4. A false positive is an outcome where the model incorrectly predicts the positive class.

2.5. A false negative is an outcome where the model incorrectly predicts the positive class.

2.6. If K=N, then K-fold cross-validation is called Leave one out cross validation, where N is the number of observations.

2.7. Menu.display() is used to display a popup menu in python.

2.8. List("abc") will produce {'a', 'b', 'c'}.

2.9. TensorFlow is a tool for solving Deep Learning problems.

2.10. Logistic regression a supervised machine learning algorithm.

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

Column X		Column Y	
3.1	TensorFlow	A.	Multidimensional array object
3.2	Computer Vision	B.	Local minima
3.3	Decision Tree	C.	Machine Learning
3.4	NumPy	D.	Non-linearly separable data
3.5	Gradient Descent	E.	Natural Language Processing
3.6	Deep Learning	F.	Cross Validation
3.7	Perceptron learning algorithm	G.	OpenCV
3.8	Backpropagation algorithm	H.	Classification
3.9	Pragmatics	I.	Convolutional Neural Network
3.10	Training	J.	Linearly separable data
		K.	evaluate machine learning
		L.	process of restructuring one or more attributes
		M.	Unsupervised learning

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

A	SIFT	B	Machine translation	C	Local minima	D	Bootstrap
E	plt.plot()	F	gplt.plot()	G	NumPy	H	Sigmoid
I	Support vector machine	J	PyTorch	K	Recall	L	Information Gain
M	regression						

4.1 The plot method on Series and DataFrame is just a simple wrapper around _____.

4.2 _____ plots are used to visually assess the uncertainty of a statistic.

4.3 _____ is tool used for extracting features in computer vision.

4.4 _____ is one of the major tasks of Natural Language Processing.

4.5 _____ is used for generating Decision Trees.

4.6 Confusion matrix is helpful in the calculation of _____.

4.7 _____ function is a preferred activation function in neural networks.

4.8 Backpropagation algorithm suffers from the problem of _____.

4.9 _____ is the core library for scientific computing.

4.10 _____ is a maximum margin classifier.

PART TWO

(Answer any FOUR questions)

5. (a) What are the key features of Python ?

(b) Differentiate between list and tuples in Python with example.

(c) What are python modules ? Name some commonly used built-in modules in Python ? **(5+5+5)**

6. Explain the following with example in support of your answer.

(a) Exception Handling in Python

(b) Arithmetic functions of NumPy library **(7+8)**

7. (a) what are potential problems with implementing K- Nearest Neighbors (KNN) on a very large data set ?

(b) what is feed forward backpropagation in neural network **(7+8)**

8. (a) How does OpenCV implements face recognition ?

(b) How does ensemble of classifiers improve the accuracy of a classification system ? **(8+7)**

9. (a) what is aggregation? Briefly discuss different methods available in Python to perform aggregations on data.

(b) Discuss the Backpropagation Algorithm **(8+7)**

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SPACE FOR ROUGH WORK

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