Series HMJ/C

SET-4

Code No. 90/C

Roll No. ☐☐☐☐☐☐☐☐

Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **12** printed pages.
- Code number 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 **5** questions.
- Please write down the Serial Number of the question in the answer-book 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 students will read the question paper only and will not write any answer on the answer-book during this period.

INFORMATICS PRACTICES (NEW)

Time allowed : 3 hours   *Maximum Marks : 70*

Instructions :

- **All** *questions are compulsory (within questions there may be choices).*
- *The question paper is divided into* **four** *sections — A, B, C and D.*
- *Section A comprises of questions 1 and 2.*
  - *(i)* *Question 1 comprises Data Handling-2 (Series, Numpy).*
  - *(ii)* *Question 2 comprises of questions from Data Handling-2 (Data Frames and its operations).*
- *Section B comprises of questions from Basic Software Engineering.*
- *Section C comprises of questions from Data Management-2.*
- *Section D comprises of questions from Society, Law and Ethics-2.*

 1 P.T.O.

SECTION A

Answer the following questions :

1. (a)   Find the output of the following program :   *1*

```
import numpy as np
Profits=np.array([1520, 1245, 1345, 1525, 2110, 1020,
                                                   1725])

print(Profits[2:5])
```

(b)   Fill in the blank with appropriate numpy method to change the contents of the given 1 dimensional array Val1D into a 2 dimensional array Val2D with 3 rows and 2 columns per row :   *1*

```
import numpy as np
Val1D=np.array([15,25,35,45,55,65])
Val2D = _____
```

(c)   Fill in the blank with the correct statement to plot a bar graph using a matplotlib method, so that Company ABC can see the graphical presentation of its Profit figures for the 2nd quarter of the financial year 2019 (i.e. August, September, October, November).   *1*

```
import matplotlib.pyplot as mtp
Months = ['AUG', 'SEP', 'OCT', 'NOV']      #X Axis
Profits = [125, 220, 230, 175]             #Y Axis
_____
mtp.show()
```

OR

A pie chart is to be drawn (using pyplot) to represent Population of States. Fill in the blank with correct statement using a matplotlib method to draw the pie chart with labels for the pie slices as the names of the States and the size of each pie slice representing the corresponding Population of the States (in crores), as per the following table :   *1*

States	Population
Rajasthan	6.8
Karnataka	6.1
Tamilnadu	7.2
Goa	1.5

2

```
import matplotlib.pyplot as plt
States = ['Rajasthan','Karnataka','Tamilnadu','Goa']
Population = [6.8,6.1,7.2,1.5]

_____

plt.show()
```

(d) Write the output of the following Python code : *2*

```
import numpy as np
Score1=(np.array([90,92,94,96,95])
Score2=(np.array([95,90,98,96,92])
S1=(np.where(Score1>Score2))
S2=(np.where(Score2>Score1))
print(Score1[S1], Score2[S2])
```

(e) The table below shows the Marks of two students for the four unit tests for academic session 2019-2020. Fill in the blanks to draw a line graph with Test Names on the X axis and Marks on the Y axis. *2*

Tests	Marks	
	Rohit	Suman
Unit1	85	97
Unit2	88	99
Unit3	89	90
Unit4	87	92

```
import matplotlib.pyplot as plt
Tests = _____  #Assign Test Names
Rohit = _____  #Assign Marks of Rohit
Suman = _____  #Assign Marks of Suman
plt.plot(Tests, Rohit, Suman)
_____  #Label Y axis as Marks
_____  #Add legends "Rohit", "Suman" for the lines
                              plt.show()
```
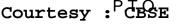
    (f)   Write single line Pandas statements for each of the following. (Assuming necessary modules have been imported) :   *2*

        (i)   Declare a Pandas series named **Packets** having dataset as :

                [125, 92, 104, 92, 85, 116, 87, 90]

        (ii)   Display the median of the elements present in the dataset of **Packets** using the Pandas method for it.

    (g)   Write Numpy single line statement for each of the following from (i) to (iii).   *3*

        (i)   To create a 3 × 2 array named **ARR2D** with the following values. (Assuming necessary modules have been imported as **np**) :

ARR2D

10	20
30	40
50	60

        (ii)   Assign the contents of the above array **ARR2D** to a new 1D array named **ARR1D**.

        (iii)   Display content of array **ARR1D** as follows :

                [10, 20, 30, 40, 50, 60]

<div align="center">**OR**</div>

Write Numpy single line statement for each of the following from (i) to (iii).   *3*

        (i)   To create a 4 × 3 array named **ARR** with the following values. (Assuming necessary modules have been imported as **np**) :

ARR

10	20	30
40	50	60
70	80	90
100	110	120

      4   **Courtesy : CBSE**

(ii) Topple the contents of the array **ARR** upside down so that its contents become :

ARR

100	110	120
70	80	90
40	50	60
10	20	30

(iii) Display the changed content of the arry **ARR** in the following format :

```
[[100  110    120]
 [70    80    90]
 [40    50    60]
 [10    20    30]]
```

2. (a) Write the correct option from (i) to (iv) for the method used in Pandas to calculate the correlation of values stored in a dataframe. *1*

   (i) **cor()**

   (ii) **correlate()**

   (iii) **corr()**

   (iv) **correlation()**

   (b) Write the correct output on execution of the following Pandas code : *1*

```
import pandas as pd
df=pd.DataFrame([("Om",93),("Jay",91)],columns=['Name',
                                                 'Mark'])
print(df.sort_values('Name', ascending=True))
```

   (c) Write the correct output on execution of the following Pandas code : *1*

```
import pandas as pd
df1= pd.DataFrame(["First","Second"],columns=['Col'])
df2= pd.DataFrame(["Third","Fourth"],columns=['Col'])
df = pd.concat([df2, df1], ignore_index=True)
print(df)
```

(d) Write the correct output on execution of the following Pandas code : *1*

```
import pandas as pd
df = pd.DataFrame({"A":[1,3,2], "B":[5,1,4], "C":[3,4,7],
                   "D":[4,6,5], "E":[2,5,3]})
print(df.quantile([0.5], axis = 1) )
```

(e) Write the correct output on execution of the following Pandas code : *2*

```
import pandas as pd
df = pd.DataFrame({'Name': ['Raj', 'Rita', 'Priya'],
                   'Type': ['Teacher', 'Student', 'Student'],
                   'Code': ['T01', 'S101', 'S102']})
print(df.pivot('Code','Type','Name'))
```

(f) Write the correct output on execution of the following Pandas code : *2*

```
import pandas as pd
df = pd.DataFrame({"A": ["P01", "P02", "P03"],
                   "B": ["Pen", "Pencil", "Eraser"]})
df=df.rename(columns={"A": "PID", "B": "PNAME"})
df=df.rename(index={0: 'A', 1: 'B', 2: 'C'})
print(df)
```

OR

Write the use of the `rename(mapper=<dict-like>, axis=1)` method for a Pandas Dataframe. Can the `mapper` and `columns` parameter be used together in a `rename()` method ? *2*

(g) Consider a dataframe `STOCK` created with the following information. Write single line Pandas statements for each of (i), (ii) and (iii). (Assuming necessary modules have been imported as `df`) : *3*

	ITEMS	ID	QUANTITY
0	PEN	1001	500
1	PENCIL	1004	300
2	ERASER	1007	280

(i)   To display the total number of all **ITEMS** in the **STOCK**

(ii)   To display the total **QUANTITY** of all **ITEMS** in the **STOCK**

(iii)   To display the Average **QUANTITY** of all **ITEMS** in the **STOCK**

OR

Consider a dataframe **Travel** created with the following information. Write single line Pandas statements for (i), (ii) and (iii) :
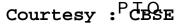
	T_Id	Type	Amount
0	T_01	TO	550
1	T_02	FROM	300
2	T_03	TO	280
3	T_02	FROM	250
4	T_03	FROM	410

(i)   To display the maximum value of the column **Amount**

(ii)   To display the sum of **Amounts** for each **Type** separately (i.e. sum of **TOs** and sum of **FROMs**)

(iii)   To display the mean for the column **Amount**   *3*

(h)   Consider a set of information for an Exam conducted for students with following details :   *3*

Names	Marks	Trials	Passed
Sanya	95	2	yes
Krish	70	3	no
Rishav	96.5	1	yes
Deepak	75	2	no
Kriti	92	1	yes

Write a Pandas code to create a Dataframe named **df** with the above information with column names as "Names", "Marks", "Trials" and "Passed" and their values as given in the table. The code should then display the total number of rows and Total number of columns in the Dataframe separately as follows :

```
Number of Rows : 5
Number of columns : 4
```

NOTE : The code must use Dataframe methods to display the Total number of rows and Total number of columns in the dataframe.

(i)   For the above created Dataframe **df** in Q.2(h) write single line statements for each of the following parts (a) to (d), which use Pandas method : *4*

    a.   To display the **'Names'** and **'Marks'** columns from the DataFrame.

    b.   To change the **'Marks'** in the 4th row (i.e. for index 3) to 91.5

    c.   To display the rows where number of **'Trials'** in the examination is less than 2 and **'Marks'** is greater than 95

    d.   To sort the DataFrame in descending order of **'Marks'**

SECTION B

3. (a)   List any two advantages of Iterative Model in Software development. *1*

    (b)   List any two advantages of Component Based Model in Software development. *1*

    (c)   What is pair programming in Agil Method of Software development ? *1*

    (d)   List any one advantage and one disadvantage of a Waterfall Model of Software Development. *2*

OR

List any one advantage and one disadvantage of an Evolutionary model of Software Development. *2*

    (e)   What are the phases of an Agile Method in Software Development ? Write any one advantage and one disadvantage of an Agile Method. *3*

OR

Write any three benefits of an Incremental model over Waterfall model. *3*

(f) Match the following Software development models in first column with their respective suitability in the second column : *3*

Spiral	Software development approach based on iterative development.
Agile	Take feedback on an initial implementation, and evolve through several versions until an acceptable system has been developed.
Incremental	Each loop represents a phase.

(g) (i) List any two properties of an actor in a Use Case Diagram. *4*

(ii) Draw the diagrammatic notations to represent an Actor and a Use Case in Use Case Diagrams.

OR

(i) List any two properties of a Use Case in a Use Case Diagram. *4*

(ii) What is an Association Link in a Use Case Diagram ? Draw a diagrammatic notation to represent an Association Link between a Student and the act of Borrowing Books.

SECTION C

4. (a) Which SQL command is used to modify the existing structure of a table ? *1*

(b) Write whether the following statement is True or False for the GET method in Django : *1*

"GET requests are never cached"

OR

Write whether the following statement is True or False for the POST method in Django : *1*

"POST requests should always be used for sensitive data"

(c) Which of the following are correct aggregate functions in SQL : *1*

(i) **AVERAGE()**

(ii) **MAX()**

(iii) **COUNT()**

(iv) **TOTAL()**

(d) Which of the following are **not** the correct names of Python files created by **django-admin** inside the folder **"MyProject/MyProject"** when we start a DJango project with a command *1*

"django-admin startproject MyProject"

    (i)   **urls.py**

    (ii)   **admin.py**

    (iii) **MyProject.py**

    (iv) **Settings.py**

(e) Write the names of any two DML commands of SQL. *1*

(f) Explain each of the following with illustrations using a table : *3*

    1.   Candidate Key

    2.   Primary Key

    3.   Foreign Key

(g) Observe the following tables TRANSACTIONS and CUSTOMERS carefully and answer the questions that follow : *3*

TABLE : TRANSACTIONS			
TNO	TYPE	AMOUNT	CNO
T1	CREDIT	1000	C3
T2	DEBIT	1500	C1

TABLE : CUSTOMERS	
CNO	CNAME
C1	ZEESHAN
C2	AMAN
C3	JASPREET

    (i)   What is the Degree of the table TRANSACTIONS ? What is the cardinality of the table CUSTOMERS ?

    (ii)   Identify the primary key and candidate keys from the table TRANSACTIONS.

(h) Write SQL queries for (i) to (iii) and the outputs for (iv) and (v), which are based on the following table PARTICIPANTS *4*

Table : PARTICIPANTS				
PNO	EVENT	SNAME	CLASS	DOB
P1	DEBATE	SANYAM	12	2001-12-25
P2	DEBATE	SHRUTI	10	2003-11-10
P3	DEBATE	MEHER	12	2001-11-10
P4	QUIZ	SAKSHI	11	2002-10-12
P5	QUIZ	RITESH	12	2001-10-12
P6	QUIZ	RAHUL	10	2003-10-12
P7	CROSSWORD	AMEER	11	2002-05-09
P8	CROSSWORD	MINAKSHI	12	2001-05-09

(i) To display details of all PARTICIPANTS of CLASS 10 and 12

(ii) To display the SNAME and CLASS of all PARTICIPANTS in ascending order of their SNAME.

(iii) To display the number of PARTICIPANTS along with their respective CLASS, of every CLASS.

(iv) **SELECT DISTINCT EVENT FROM PARTICIPANTS;**

(v) **SELECT MAX(DOB), PNO FROM PARTICIPANTS GROUP BY PNO HAVING COUNT(*)>1;**

OR

Write Python code for the following : *4*

(a) To create a MySQL connection named db for **localhost,** with **username = "teacher"** and **password = "myclass"**

(b) To create a database cursor named as **dbcrsr.**

(c) To open a database named **"CLASS"** using the above declared database cursor **dbcrsr.**

(d) To add a new record into the table **"STUDENT"** in the above connected database, **"CLASS"** with details for the attributes **(SNo, SName, Marks)** as **("S102", "Tanya", 92.5)**

SECTION D

5. (a) A software company purchases new computers every year and discards the old ones into the local dumping yard. Write the name of the most appropriate category of waste that the organisation is creating every year, out of the following options : *1*

    (i) Business Waste

    (ii) Commercial Waste

    (iii) Solid Waste

    (iv) E-Waste

(b) Write names of any two common types of Intellectual Property Rights which are protected by the law. *1*

(c) A research student is expected to write a thesis on a topic. The student browses Internet for the topic and luckily finds it on the Internet. He copies and submits the entire thesis as his own research work. Which of the following activities appropriately categorises the act of the writer ? *1*

    (i) Spamming

    (ii) Phishing

    (iii) Plagiarism

    (iv) Trojan

(d) What is Open Source Software ? Write the names of any two software which can be categorized as Open Source. *2*

(e) Suggest techniques which can be adopted to impart Computer Education for : *2*

    (i) Visually impaired students (someone who cannot see).

    (ii) Mobility challenged students (someone who cannot write).

(f) Write any three benefits of crowdsourcing. *3*

OR

Write any three features of smart mobs. *3*