SCORE PLUS

For Class 12
Term I Exam
2021-22

QUESTION BANK and CBSE Sample Paper with Model Test Papers in

Informatics Practices

(Subject Code 065)

Gurmeet Singh

- As per the latest **Reduced & bifurcated Syllabus** for **Term I Examination** to be held in November-December 2021.
- Chapterwise **Multiple Choice Questions.**
- Chapterwise **Case Study Based Multiple Choice Questions.**
- The latest **CBSE Sample Question Paper** for **Term I Examination** to be held in November-December 2021.
- **5 Model Test Papers** based on the **latest CBSE Sample Question Paper** for Term I Examination.

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Strictly according to the **Latest Reduced & bifurcated Syllabus** and the **Latest Sample Question Paper** released by the **Central Board of Secondary Education**, New Delhi, for the Term I Examination to be held in **November-December 2021.**

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By
Gurmeet Singh
MCA, MSC (IT)

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PREFACE

We are pleased to present our book **SCORE PLUS Question Bank and CBSE Sample Paper with Model Test Papers in Informatics Practices** for **Class XII (Subject Code 065)** in strict accordance with the **Latest Reduced of bifurcated Syllabus** and the **Latest Sample Question Paper** released by the **Central Board of Secondary Education,** New Delhi, for Term I Examination to be held in November-December 2021.

This book contains the brief introduction of each topic with solved examples. In each chapter, topicwise questions have been set. "Easy to difficult" level of questions is maintained. We have tried to clear all the concepts in easy language and with solved examples. Most of the questions are taken from the last year CBSE paper or based on CBSE pattern.

In the next part of book, sample question paper of Computer Science released by CBSE with its solution is published. After sample paper, there are 5 model test papers with their solutions prepared keeping in mind the blueprint of the CBSE sample question paper.

Some specific features of this book are:

- Strictly as per the latest **Reduced and bifurcated syllabus** and the latest **CBSE Sample Question Paper** released by the CBSE for Term I Examination to be held in November December 2021.
- Chapterwise **Question Bank** provides topicwise comprehensive range of solved and unsolved questions including questions from past years' papers to provide thorough understanding of the chapter.
- **The latest CBSE Sample Question Paper** for **Term I Examination** to be held in November-December 2021.
- **5 Model Test Papers** based on the latest CBSE Sample Question Paper for Term I Examination.

We hope this book provides enough practice materials and would help students in scoring high during this academic year along with the final board examination.

Author

Goyal Brothers Prakashan

Syllabus

INFORMATICS PRACTICES CLASS XII

Code No. 065, Session 2021-2022

1. Prerequisite: Informatics Practices – Class XII

2. Learning Outcomes

At the end of this course, students will be able to:

- Create Series, Data frames and apply various operations.
- Visualize data using relevant graphs.
- Design SQL queries using aggregate functions.
- Learn terminology related to networking and the internet.
- Identify internet security issues and configure browser settings
- Understand the impact of technology on society including gender and disability issues.

3. Distribution of Marks and Periods

Unit No	Units Name	Marks	Periods Theory	Periods Theory	Total Period
1.	Data Handling using Pandas and Data Visualization	25	25	25	50
2.	Database Query using SQL	25	20	17	37
3.	Introduction to Computer Networks	10	12	0	12
4.	Societal Impacts	10	14	–	14
	Project	–	–	7	7
	Practical	30	–	–	–
	Total	100	71	49	120

Term – I

Distribution of Theory Marks

Unit No	Units Name	Marks
1.	Data Handling using Pandas and Data Visualization	25
4.	Societal Impacts	10
	Total	35

Unit 1: Data Handling using Pandas and Data Visualization

Data Handling using Pandas -I

- Introduction to Python libraries - Pandas, Matplotlib.
- Data structures in Pandas - Series and data frames. Series: Creation of series from dictionary, scalar value; mathematical operations; series attributes, head and tail functions; selection, indexing and slicing.
- Data Frames: creation of data frames from dictionary of series, list of dictionaries, text/CSV files, display, iteration. Operations on rows and columns: add (insert/append), select, delete (drop column and row), rename, Head and Tail functions, indexing using labels, Boolean indexing.

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Data Visualization

- Data Visualization : Purpose of plotting, drawing and saving of plots using Matplotlib (line plot, bar graph, histogram). Customizing plots: adding label, title, and legend in plots.

Unit 4: Societal Impacts

- Digital footprint, net and communication etiquettes,
- Data protection, intellectual property rights (IPR), plagiarism, licensing and copyright,
- Free and open source software (FOSS),
- Cybercrime and cyber laws, hacking, phishing, cyber bullying, overview of Indian IT Act.
- E-waste: hazards and management. Awareness about health concerns related to the usage of technology.

Distribution of Practical Marks

Topic	Marks
Pandas program (pen and paper or Collab or any online idle or pyroid screen for mobile)	8
Practical File- 15 python Programs	3
Project Synopsis	2
Viva	2
Total	15

Suggested Practical List

Programming in Python

1. Create a panda's series from a dictionary of values and a ndarray
2. Given a Series, print all the elements that are above the 75th percentile.
3. Create a Data Frame quarterly sales where each row contains the item category, item name, and expenditure. Group the rows by the category and print the total expenditure per category.
4. Create a data frame for examination result and display row labels, column labels data types of each column and the dimensions
5. Filter out rows based on different criteria such as duplicate rows.
6. Importing and exporting data between pandas and CSV file

5.2 Visualization

1. Given the school result data, analyses the performance of the students on different parameters, e.g subject wise or class wise.
2. For the Data frames created above, analyze, and plot appropriate charts with title and legend.
3. Take data of your interest from an open source (e.g. data.gov.in), aggregate and summarize it. Then plot it using different plotting functions of the Matplotlib library.

Project Synopsis

The synopsis should cover the brief description about the project along with reasons for selection of the dataset. The learner should write the source of the dataset whether created or taken from any reliable source. The learner should write what analytics can be done on the project.

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[Released by CBSE in September 2021
for the Term I Examination to be held in November-December 2021]

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for the Term I Examination to be held in November-December 2021]

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SECTION : A

1 Series

Series is a one-dimensional array like structure with homogeneous data. For example, the following series is a collection of integers 10, 23, 56, …

Pandas Series is a one-dimensional labeled array capable of holding any data type (integer values, string values, double value and more). A Series represents a single column in memory. Series can only contain single list with index, whereas dataframes can be made of more than one series or we can say that a dataframes is a collection of series.

Python Pandas

Pandas is a software library written for the Python programming language for data manipulation and analysis. Pandas is defined as an open-source library that provides high-performance data manipulation in Python. The name of Pandas is derived from the word Panel Data, which means an Econometrics from Multidimensional data. It is used for data analysis in Python and developed by Wes McKinney in 2008.

Key Points of Series

- Homogeneous data
- Size Immutable
- Values of Data Mutable

A pandas Series can be created using the following constructor − pandas. Series(data, index, dtype, copy)

Sr. No	Parameter	Description
1.	data	data takes various forms like ndarray, list, constants
2.	index	Index values must be unique and hashable, same length as data. Default np.arrange(n) if no index is passed.
3.	dtype	dtype is for data type. If None, data type will be inferred
4.	copy	Copy data. Default False

CREATION OF SERIES

A series can be created using various inputs like:

- List
- Array
- Tuple
- Scalar value or constant
- Dictionary

Create an Empty Series

A basic series, which can be created is an Empty Series.

1. Write a program to create an empty series
#import the pandas library and aliasing as pd

Ans.
```
import pandas as pd
s =pd.Series()
print (s)
```
Its output is as follows :
Series([], dtype: float64)

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Create a Series from List

2. Write a program to create a series by given list ['red','green','blue'].

Ans.
```
import pandas as pd
c=['red','green','blue']
p=pd.Series(c)
print (p)
```
OR
```
import pandas as pd
c=['red','green','blue']
p=pd.Series(data=c)
print (p)
```
OR
```
import pandas as pd
p=pd.Series(['red','green','blue'])
print (p)
```
Output:

0	red
1	green
2	blue

We did not pass any index, so by default, it assigned the indexes ranging from 0 to len(data)-1, i.e., 0 to 2.

3. Modify the above program and change the index values to r,g,b.

Ans.
```
import pandas as pd
c=['red','green','blue']
p=pd.Series(c,index=['r','g','b'])
print (p)
```
OR
```
import pandas as pd
p=pd.Series(['red','green','blue'],index=[r,g,b])
print (p)
```
OR
```
import pandas as pd
c=['red','green','blue']
p=pd.Series(c,[r,g,b])
print (p)
```
OR
```
import pandas as pd
c=['red','green','blue']
p=pd.Series(data=c,index=[r,g,b])
print (p)
```
Output:

r	red
g	green
b	blue

Create a Series from Tuple

4. Write a program to create a series from a given Tuple data data=('1','Aman',86.3,'A').

Ans.
```
import pandas as pd
```

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```
data=('1','Aman',86.3,'A')
p=pd.Series(data)
print  (p)
```

output

```
0       1
1       Aman
2       86.3
3       A
```

Create a Series from Dictionary

A dictionary can be passed as input and if no index is specified, then keys of the dictionary are used to represent the index of the Series.

5. A dictionary data ={'a':0.,'b':1.,'c':2} is given. Write a program to create series from dictionary data.

Ans.
```
import  pandas  as  pd
data  ={'a':0.,'b':1.,'c':2.}
s  =pd.Series(data)
print(s)
```

Its output is as follows –

```
a       0.0
b       1.0
c       2.0
dtype: float64
```

If index is passed, the values will be displayed in the same sequence as index values are passed.

```
import  pandas  as  pd
data  ={'a':0.,'b':1.,'c':2.}
s  =pd.Series(data,index=['b','c','a'])
print(s)
```

Its output is as follows –

```
b       1.0
c       2.0
a       0.0
```

You can also show the specified values by giving their keys as index values.

6. Modify the above program and display values of 'a' and 'c' only.

Ans.
```
import  pandas  as  pd
data  ={'a':0.,'b':1.,'c':2.}
s  =pd.Series(data,index=['a','c'])
print(s)
```

Its output is as follows –

```
a       0.0
c       2.0
```

If index value is passed other than keys value then NaN (Not a Number) as value will be displayed.

7. Give the output:

Ans.
```
import  pandas  as  pd
data  ={'a':0,'b':1.,'c':2.}
```

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```
s =pd.Series(data,index=['b','c','d','a'])
print(s)
```
Its output is as follows −

b	1.0
c	2.0
d	NaN
a	0.0

dtype: float64

Observe − Index order is persisted and the missing element is filled with NaN (Not a Number).

Create a Series from Scalar/Constant value

If data is a scalar value, an index must be provided. The value will be repeated to match the length of index.

8. Write a program to create a series to print scalar value "5" four times.

Ans.
```
import pandas as pd
s =pd.Series(5, index=[0,1,2,3])
print(s)
```
Its output is as follows −

0	5
1	5
2	5
3	5

As you can see the "5" is printed 4 times because the length of index is 4.

Create a Series from ndarray

9. Write a program to create a series from ndarray with elements 'a','b','c','d'

Ans.
```
import pandas as pd
import numpy as np
data =np.array(['a','b','c','d'])
s =pd.Series(data)
print(s)
```
Its output is as follows −

0	a
1	b
2	c
3	d

dtype: object

10. Give the output:
```
import pandas as pd
import numpy as np
data =np.arange(10,15)
s =pd.Series(data)
print(s)
```
Ans.

0	10
1	11
2	12
3	13
4	14

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REINDEXING

Reindex means to conform the data to match a given set of labels along a particular axis. Reorder the existing data to match a new set of labels. Reindexing does not mean providing new index values; in fact, it is used to reorder the existing data or print specified data.

11. Give the output:

```
import pandas as pd
name=['Raj','Ankur','Harsh']
p=pd.Series(name,index=[2,5,6])
print(p)
# Reindex the series and create a new series variable
p1=p.reindex([6,2,5])
print (p1)
```

Ans.
```
2    Raj
5    Ankur
6    Harsh
6    Harsh
2    Raj
5    Ankur
```

12. Give the output:

```
import pandas as pd
name=['Raj','Ankur','Harsh']
p=pd.Series(name,index=[2,5,6])
print(p)
p1=p.reindex([2,5])
print (p1)
```

Ans.
```
2    Raj
5    Ankur
6    Harsh
dtype:  object
2    Raj
5    Ankur
dtype:  object
```

if other than existing index value is provided to reindex then NaN will be displayed.

13. Give the output:

```
import pandas as pd
name=['Raj','Ankur','Harsh']
p=pd.Series(name,index=[2,5,6])
print(p)
p1=p.reindex([2,4,5])
print (p1)
```

Ans.
```
2    Raj
5    Ankur
6    Harsh
dtype:  object
2    Raj
4    NaN
5    Ankur
dtype:  object
```

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ALTER INDEX VALUES

The Series index function does not only allow you to display the index items, but you can also alter it as well. This example changes the actual index items and places the integer values as the index.

14. Give the output:

```
import pandas as pd
S = pd.Series([10,20,30,40,50], index = ['a', 'e', 'i', 'o', 'u'])
print(S)
# Assigning New Index Values
S.index = [1, 2, 3, 4, 5]
print("Series after new index values")
print(S)
```

Ans.
```
a    10
e    20
i    30
o    40
u    50
dtype: int64
Series after new index values
1    10
2    20
3    30
4    40
5    50
dtype: int64
```

'NAME' ATTRIBUTE

The Series Object has an important attribute called name. You can use this attribute to assign a name for both the data and the indexes.

15. Give the output:

```
import pandas as pd
D={'r':'red','g':'green','b':'blue'}
S=pd.Series(D,index=['r','b','g'])
S.name="colourname"
S.index.name="code"
print(S)
```

Ans.
```
code
r     red
b     blue
g     green
Name: colourname, dtype: object
```

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SIZE ATTRIBUTE

All pandas data structures are value-mutable (the values they contain can be altered). All pandas data structures are size mutable except Series. The length of a Series cannot be changed, i.e. number of columns and rows can't be altered once defined. Series is size immutable.

16. What is Series Size?

Ans. Size attribute returns the number of elements in the underlying data for the given series objects.

17. Give the output:

```
import pandas as pd
L=[10,20,30]
S=pd.Series(L)
print(S.size)
```

Ans. 3

PRACTICE QUESTIONS I

1. What is series? Explain with the help of an example. **[SP 2019-20]**

Ans. Pandas Series is a one-dimensional labeled array capable of holding data of any type (integer, string, float, python objects, etc.). The axis labels are collectively called index.

Example:

```
import pandas as pd
# simple array
data =pd.Series([1,2,3,4,5])
print(data)
```

2. Write a suitable Python code to create an empty series.

Ans.
```
import pandas as pd
s=pd.Series()
print (s)
```

3. Write single line Pandas statement to declare a Pandas series named Packets having dataset as:
[125, 92, 104, 92, 85, 116, 87, 90] **[Comptt 2020]**

Ans. Packets = pd.Series([125, 92, 104, 92, 85, 116, 87, 90])

4. Write single line Pandas statement to declare a Pandas series named S having dataset as:
(44,65,35,77,87,90)

Ans. S=pd.Series((44,65,35,77,87,90))

5. Write single line Pandas statement to declare a Pandas series named SR having dataset as:
{1:'one',2:'two',3:'three'}

Ans. SR=pd.Series({1:'one',2:'two',3:'three'})

6. Write python code to create the following Series Stock (using list)

Sno	
1	PEN
2	PENCIL
3	ERASER

Ans.
```
import pandas as pd
L=["PEN","PENCIL","ERASER"]
Stock=pd.Series(L,index=[1,2,3])
Stock.index.name="Sno"
print(Stock)
```

7. Write python code to create the Series EMP with following data (using Dictionary)

Code	
E1	Sanya
E2	Krish
E3	Rishav
E4	Deepak

Ans.
```
import pandas as pd
d={"E1":"Sanya","E2":"Krish","E3":Rishav","E4":"Deepak"}
EMP=pd.Series(d)
EMP.index.name="code"
print(EMP)
```

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8. Write python code to create series S with the following data by using numpy.

A	10
B	20
C	30
D	40
E	50

Ans.
```
import pandas as pd
import numpy as np
data=np.array([10,20,30,40,50])
#or data =np.arange(10,51,10)
s =pd.Series(data,index=['A','B','C','D','E'])
print(s)
```

9. Jasmeet has created the series School but forget to give the index values ['S1','S2','S3','S4']. Write single line command to set the index values to series School.

Ans. School.index=['S1','S2','S3','S4']

10. Write python series to print scalar value "100" 5 times with index values(1,2,3,4,5)

Ans.
```
import pandas as pd
s = pd.Series(100, index=[1, 2, 3, 4,5])
```
OR
```
s = pd.Series(100, [1, 2, 3, 4,5])
print (s)
```

11. Write python code to create the following series:

101	Harsh
102	Arun
103	Ankur
104	Harpahul
105	Divya
106	Jeet

(i) using list (ii) using tuple (iii) using Dictionary (iv) using numpy

Ans. (i)
```
import pandas as pd
L=["Harsh","Arun","Ankur","Harpahul","Divya","Jeet"]
s=pd.Series(L,index=[101,102,103,104,105,106])
print(s)
```
(ii)
```
import pandas as pd
L=("Harsh","Arun","Ankur","Harpahul","Divya","Jeet")
s=pd.Series(L,index=[101,102,103,104,105,106])
print(s)
```
(iii)
```
import pandas as pd
D={101:"Harsh",102:"Arun", 103:"Ankur",104:"Harpahul",105:"Divya",106:"Jeet"}
s=pd.Series(D)
print(s)
```
(iv)
```
import pandas as pd
import numpy as np
L=np.array(["Harsh","Arun","Ankur","Harpahul","Divya","Jeet"])
s=pd.Series(L,index=[101,102,103,104,105,106])
print(s)
```

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12. Write a program to create a series by using given an array ['a','b','c','d'] and assign index values 100,101.....

Ans.
```
import pandas as pd
import numpy as np
data =np.array(['a','b','c','d'])
s =pd.Series(data,index=[100,101,102,103])
print(s)
```
Its output is as follows –

100	a
101	b
102	c
103	d
dtype:	object

13. Give the output:
```
import pandas as pd
s =pd.Series(10, index=[5,6,7,9])
print(s)
```

Ans.

5	10
6	10
7	10
9	10

14. Give the output:
```
import pandas as pd
s =pd.Series("ABC", index=[0,1,2])
print(s)
```

Ans.

0	ABC
1	ABC
2	ABC

15. Give the output:
```
import pandas as pd
name=['Pahul','Aman','Karan']
p=pd.Series(name,index=[0,1,2])
p1=p.reindex([2,1,0])
print(p)
print (p1)
```

Ans.

0	Pahul
1	Aman
2	Karan
2	Karan
1	Aman
0	Pahul

16. Give the output:
```
import pandas as pd
name=['Pahul','Aman','Karan']
p=pd.Series(name,index=[0,1,2])
p1=p.reindex([1,2,3])
print(p)
print (p1)
```

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Ans. 0 Pahul
1 Aman
2 Karan
1 Aman
2 Karan
3 NaN

17. Give the output:

```
import pandas as pd
S=pd.Series([10,20,30,40],index=['a','b','c','d'])
print(S)
S.index=['d','c','b','a']
print(S)
```

Ans. a 10
b 20
c 30
d 40
dtype: int64
d 10
c 20
b 30
a 40

```
import pandas as pd
C=['red','green','blue']
p=pd.Series(C,index=['r','g','b'])
print (p)
```

ACCESSING DATA

Accessing using head()

By default Series.head() function display top 5 rows. To print *n* no of top rows, pass *n* as parameter i.e. Series. head(n)

18. Write a code to create a series from empno list and show the first five rows
empno = [101,102,103,104,105,106,107]

Ans.

```
import pandas as pd
p=pd.Series(empno)
print (p.head())
```

output:
0 101
1 102
2 103
3 104
4 105

19. Using the above series write a single line statement to show the first 3 rows using head()

Ans. print(p.head(3))
output:
0 101
1 102
2 103

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Accessing using tail()

By default Series.tail() function display last 5 rows. To print *n* no of last rows, pass *n* as parameter i.e. Series. tail(n)

20. Write a code to create a series from empno list and show the last five rows
empno=[101,102,103,104,105,106,107]

Ans.
```
import pandas as pd
p=pd.Series(empno)
print (p.tail())
output:
```
2 103
3 104
4 105
5 106
6 107

21. Fill the missing statements

```
import pandas as pd
L=[101,102,103,104,105,106,107]
_=pd.Series(L) #statement 1
print (p.___(3)) #statement 2
output:
```
4 105
5 106
6 107

Ans. p=pd.Series(L) #statement 1
print (p.tail(3)) #statement 2

Indexing

Pandas now supports three types of indexing.

(i) loc: is label based indexing.

(a) A single label

22. Give the output:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.loc['a'])
print(s.loc[0])
```

Ans. 10
40
in loc[0], 0 is interpreted as a label of the index. This is not an integer position along the index.

(b) A list of labels

23. Give the output:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.loc[['b','c',1]])
```

Ans.
b 20
c 30
1 50

(c) A slice object with labels

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A slice is a subset of series elements.

my_series[start:stop:step]

where start is the index of the first element to include, stop is the index of the item to stop and step sets the interval

24. Give the output:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.loc['a':'c'])
```

Ans. a 10
b 20
c 30

Note: Both the start and the stop are included, when present in the label index.

(ii) iloc: integer position based. This series can also be indexed by position (using integers) even though it has string index entries! The first item is at key 0, and the last item is at key -1

(a) input an integer

25. Give the output:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.iloc[0])
```

Ans. 10

(b) input a listof integers

26. Write a program to print the values of 0,2,4 positions from Series s[10,20,30,40,50] using .iloc.

Ans.
```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.iloc[[0,2,4]])
```

output

a 10
c 30
1 50

(c) input a slice object with ints

A slice is a subset of series elements.

my_series[start:stop:step]

where start is the index of the first element to include, stop is the index of the item to stop without including the stop value and step sets the interval.

27. Show the first 3 values from Series using iloc.

Ans.
```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.iloc[0:3])
```

a 10
b 20
c 30

(iii) with [ ]: Accessing Data from Series with Position and Using Label (index). By using [] you can take advantage of both .loc and .iloc.

You can access the records using [] directly. If index value is not defined you can pass default index value 0,1,2... to access the elements.

If string index values are defined then elements can be accessed by both ways : passing default index values(0,1,2...) or passing defined string index values.

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If integer index values are defined, [] will work only as .loc i.e. elements can be accessed by passing defined index values only.

28. Give the output:

```
import pandas as pd
M=[15,-10,56,39,-90,15]
p=pd.Series(M)
print(p[0])
print(p[[0,3,4]])
```

Ans. 15

```
0    15
3    39
4   -90
```

29. Give the output of the following program:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index=['a','b','c','d','e'])
print(s[0])                    #or print(s.iloc[0])
print(s['a':'c'])        #or print(s.loc['a':'c'])
print(s[2])                    #or print(s.iloc[s[2])
print(s['a'])                  #or print(s.loc['a'])
```

Its output is as follows –

Ans. 10

```
a    10
b    20
c    30
30
10
```

30. Give the output of the following program:

```
import pandas as pd
s =pd.Series([10,20,30,40,50,60,70,80],index =['a','b','c','d','e','f','g','h'])
print(s[2:5])
print(s[1:7:2])
print(s['b':'f':2])
```

Ans.

```
c       30
d       40
e       50
dtype:  int64
b       20
d       40
f       60
dtype:  int64
b       20
d       40
f       60
dtype:  int64
```

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31. Give the output:

```
import pandas as pd
M=[15,-10,56,39,-90,15]
p=pd.Series(M,index=[10,20,30,40,50,60])
print(p[10])
print(p[[10,30,50]])
print(p[0])      # will raise an error message
```

Ans. 15

10 15
30 56
50 -90
error message

Using a Boolean Indexing for Extraction

Series elements can also be extracted using a predicate function (a function returning True or False) as shown in this example.

32. Write code to show rows those empno are greater than 103.

Ans.

```
import pandas as pd
empno=[101,102,103,104,105,106,107]
p=pd.Series(empno)
print (p[p>103])
```

Output

3 104
4 105
5 106
6 107

33. Fill the missing statement to show row whose rollno is 11.

Ans.

```
import pandas as pd
rollno=[10,11,12,13,14]
p=pd.Series(rollno)
```

Output

1 11

print (p[p==11])

PRACTICE QUESTIONS II

1. Fill the mising statement to print top 5 rows.

```
import pandas as pd
empno=[101,102,103,104,105,106,107]
p=pd.Series(empno)
```

---

output:

0 101
1 102
2 103
3 104
4 105

Ans. print (p.head())

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2. Fill the missing statements to get the given output:

```
import pandas as pd
empno=[101,102,103,104,105,106,107]
p=pd.Series(_____)  #statement 1
print (p._____(3))#statement 2
```

output

0 101
1 102
2 103

Ans. statement 1
p=pd.Series(empno)
statement 2
print(p.head(3))

3. Write single line python code to display last three rows using tail() from series P.

Ans. print(P.tail(3))

4. Fill the missing statement to retrieve the first three elements in the Series.

```
import pandas as pd
s =pd.Series([1,2,3,4,5],index =['a','b','c','d','e'])
print(s[ _ ])
```

Its output is as follows –

a 1
b 2
c 3

Ans. print(s[:3]) or print(s[0:3]) or print(s[[0,1,2]])
or print(s[['a','b','c']]) ot print(s['a':'c'])

5. Fill the missing statement to print value of first element using index label value.

```
import pandas as pd
s =pd.Series([1,2,3,4,5],index =['a','b','c','d','e'])
#retrieve a single element
```

_____

Its output is as follows
1

Ans. print(s['a']) or
print(s.loc['a']) or
print(s.iloc[0]) or
print(s.head(1))

6. Give the output:

```
import pandas as pd
s =pd.Series([1,2,3,4,5],index =['a','b','c','d','e'])
print(s[['a','c','d']])
```

Ans. Its output is as follows –

a 1
c 3
d 4
dtype: int64

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7. Fill the missing values to get the desired output.

```
import pandas as pd
name=['Harsh','Arun','Ankur','Harpahul','Divya','Jeet']
empno=[101,102,103,104,105,106]
p=pd.Series(_____,index=_______)
print ('name of empno 101 is',p[____])
```

Output

name of empno 101 is Harsh

Ans.

```
import pandas as pd
name=['Harsh','Arun','Ankur','Harpahul','Divya','Jeet']
empno=[101,102,103,104,105,106]
p=pd.Series(name,index=empno)
print ('name of empno 101 is',p[101])
```

8. Give the output:

```
import pandas as pd
name=['Harsh','Arun','Ankur','Harpahul','Divya','Jeet']
empno=[101,102,103,104,105,106]
p=pd.Series(name,index=empno)
print ('Sales persons are \n',p[[101,105,106]])
```

Ans. Sales persons are

101 Harsh
105 Divya
106 Jeet
4

9. (i) Write python code to create the following series

101 Harsh
102 Arun
103 Ankur
104 Harpahul
105 Divya
106 Jeet

(ii) Show details of 1st 3 employees using head function
(iii) Show details of last 3 employees using tail function
(iv) Show details of 1st 3 employees without using head function
(v) Show details of last 3 employee without using tail function
(vi) Show value of index no 102
(vii) Show 2nd to 4th records
(viii) Show values of index no=101,103,105
(ix) Show details of "Arun"

Ans. (i)

```
import pandas as pd
name=['Harsh','Arun','Ankur','Harpahul','Divya','Jeet']
p=pd.Series(name,index=[101,102,103,104,105,106])
print (p)
```

(ii) print (p.head(3))
(iii) print (p.tail(3))
(iv) print(p[:3]) or pirnt(p.loc[101:103]) or print(p,iloc[0:3]) or print(p[[101,102,103]])
(v) print (p[-3:]) or print(p[3:]) or print(p[[104,105,106]])

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(vi) print(p[102]) or print(p.loc[102])
(vii) print(p[1:4])
(viii) print(p[[101,103,105]])
(ix) print(p[p= ='Arun'])

10. Give the output:

```
import pandas as pd
s = pd.Series([1,2,3,4,5],index = ['a','b','c','d','e'])
print (s[0])
print(s['a'])
```

Ans. 1
1

11. Give the output:

```
import pandas as pd
c=['red','green','blue','pink','black','white']
p=pd.Series(c,index=['r','g','b','p','k','w'])
print (p[2])          #1
print(p[:2])          #2
print(p[2:])          #3
print(p[2:5])         #4
print(p[1:5:2])       #5
print(p[: : 2]        #6
print(p[-1])          #7
print(p[::-1])        #8
print(p[-1:-4:-1])    #9
print(p[-1:-5:]       #10
```

Ans. blue #1

r red #2
g green

b blue #3
p pink
k black
w white

b blue #4
p pink
k black

g green #5
p pink

r red #6
b blue
k black

white #7

w white #8
k black
p pink

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b blue
g green
r red
w white #9
k black
p pink
No output #10

12. Fill the missing statements to get the given output:

```
import pandas as pd
rollno=[1,2,3,4,5,6,7]
__=pd.Series(____) #statement 1
print (p.head(_))#statement 2
```

output

0 1
1 2
2 3

Ans. statement 1
p=pd.Series(rollno)
statement 2
print(p.head(3))

13. Fill the missing statements to get the desired output:

```
import pandas as pd
L=[101,102,103,104,105,106,107]
_=pd.Series(L) #statement 1
print (p.___(3)) #statement 2
```

output:

4 105
5 106
6 107

Ans. p=pd.Series(L) #statement 1
print (p.tail(3)) #statement 2

14. Give the output:

```
import pandas as pd
name=['Pahul','Aman','Karan']
p=pd.Series(name,index=[0,1,2])
p1=p.reindex([2,1,0])
print(p)
```

print (p1)

Ans. 0 Pahul
1 Aman
2 Karan
2 Karan
1 Aman
0 Pahul

15. Give the output:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =[1,2,3,4,5])
```

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```
print(s.loc[2])
print(s.iloc[2])
print(s[2])
```

Ans. 20
30
20

16. Poonam wants to display first 3 elements from series S. She wrote the following program:

```
import pandas as pd
S=pd.Series([10,20,30,40,50],index =[1,2,3,4,5])
print(S.iloc[1:3])
```

But she did not get the desired result. Rewrite the above program with necessary changes to help her get the desired output.

Ans.
```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =[1,2,3,4,5])
print(s.loc[1:3])
```

OR

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =[1,2,3,4,5])
print(s[0:3])
```

OR

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =[1,2,3,4,5])
print(s.iloc[0:3])
```

17. Write a program to create a series from list marks and taking index values from list rollno. Show all elements that are above 75 marks.

Ans.
```
import pandas as pd
rollno=[1,2,3,4,5,6]
marks=[23,86,74,11,98,75]
s=pd.Series(marks,index =rollno)
print(s[s>75])
```

Output:

2 86
5 98

18. Consider the following Series Object,Student

(i) Write the command which will display the names of students having stream="Arts"

(ii) Write the command to name the series as Subject.

Mishra	Commerce
Gupta	Arts
Khan	Science
Chaddha	Commerce
Yadav	Arts

Ans. (i) print(student[student=="ARTS"])

(ii) student.name="Subject"

MATHEMATICAL OPERATIONS

sum()	Returns sum of all values in the series
mean()	Returns mean of all values in series. Equals to sum()/count()
std()	Returns standard deviation of all values
min()	Return minimum value from series

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max()	Return maximum value from series
idxmin()	Returns index of min value in series
idxmax()	Returns index of max value in series
median()	Returns median of all value
mode()	Returns mode of the series
value_counts()	Returns series with frequency of each value
describe()	Returns a series with information like mean, mode, quantile etc

34. Write python code to create the series by given list marks and display the mean, median, mode and standard deviation from the series
marks=[25,30,25,27,23,60]

Ans.
```
import pandas as pd
marks=[25,30,25,27,23,60]
p=pd.Series(marks,index=[101,102,103,104,105,106])
print(p)
print("Mean=",p.mean())
print("Median=",p.median())
print("Mode=",p.mode())
print("standard deviation",p.std())
```
output:
101 25
102 30
103 25
104 27
105 23
106 60
Mean= 31.666666666666668
Median= 26.0
Mode= 0 25
standard deviation 14.080719678577038

35. Give the output:
```
import pandas as pd
marks=[25,30,25,27,23,60]
p=pd.Series(marks,index=[101,102,103,104,105,106])
print(p)
print("Sum=",p.sum())
print("Minimum value=",p.min())
print("Maximum value=",p.max())
print("Index value of Min value=",p.idxmin())
print("index value of Max Value=",p.idxmax())
print("count each value\n" ,p.value_counts())
```

Ans. Sum= 190
Minimum value= 23
Maximum value= 60

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Index value of Min value= 105
index value of Max Value= 106
count each value
25 2
23 1
30 1
60 1
27 1

ARITHMETIC OPERATIONS

The pandas Series allows you to perform arithmetic operations on its data.

36. Give the output:

Ans.
```
import pandas as pd
S=pd.Series([10,20,30,40],index=['a','b','c','d'])
print("Add 2 to each item in a series")
print(S+2)
print("Subtracting 3 from series items")
print(S-3)
```
output:
Add 2 to each item in a series
a 12
b 22
c 32
d 42
dtype: int64
Subtracting 3 from series items
a 7
b 17
c 27
d 37
dtype: int64

37. Given the following Series S1

	S1
1	10
2	20
3	30
4	40
5	50

Give the output after execution of the following python statement print(S1+5)

Ans.
1 15
2 25
3 35
4 45
5 55

38. Write a program to create two series P1 and P2 with the following data and give command to add P1 and P2.

	P1		P2
A	10	A	100
B	20	B	200
C	30	C	300
D	40	D	400
E	50	E	500

Ans.
```
import pandas as pd
P1=pd.Series([10,20,30,40,50],index=["A","B","C","D","E"])
P2=pd.Series([100,200,300,400,500],index=["A","B","C","D","E"])
print(P1+P2)
```

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39. Given the following two series P1 and P2
Give the output of following command.
print(P1+P2)

P1		P2	
A	10	A	100
B	20	B	200
C	30	C	300
D	40	D	400
E	50	E	500

Ans.
A 110
B 220
C 330
D 440
E 550

'IN' OPERATOR

In operator can check whether the index that we are looking for existed or not and returns True, if it exists otherwise, False.

40. Give the output:

```
import pandas as pd
S=pd.Series([10,20,30,40],index=['a','b','c','d'])
print('b' in S)
print('e' in S)
```

Ans. True False

DELETION

Using drop function: By using drop(index value) function you can delete elements from Series. Drop function does not remove elements in existing series instead this function return Series with specified index labels removed.

(a) single row deletion

41. Write a program to delete a first element from series.

Ans.

```
import pandas as pd
lt=['a','b','c','d','e']
p=pd.Series(lt)
p=p.drop(p.index[0])     # or drop(0)
print(p)
```

Output:
1 b
2 c
3 d
4 e

You can delete the records using drop function directly. If index value is not given it will take defalut index value 0,1,2... if index defined then it will take new defned index value.

42. Modify the above program and delete the element whose index no is 1.

Ans.

```
import pandas as pd
lt=['a','b','c','d','e']
p=pd.Series(lt)
p=p.drop(1)
print(p)
```

0 a
2 c
3 d
4 e

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43. Give the output:

```
import pandas as pd
lt=['a','b','c','d','e']
p=pd.Series(lt,index=[1,2,3,4,5])
p=p.drop(1)
print(p)
```

Ans. 2 b
3 c
4 d
5 e

44.

```
import pandas as pd
lt=['a','b','c','d','e']
p=pd.Series(lt,index=[1,2,3,4,5])
p=p.drop(0)
print(p)
```

Ans. KeyError: '[0] not found in axis

(b) To remove several items, include a list of index positions:

45. Give the output of the following program

```
import pandas as pd
lt=['a','b','c','d','e']
p=pd.Series(lt)
p=p.drop(p.index[[0,2,4]])
print(p)
```

Ans. 1 b
3 d

(c) Slicing also can be used to remove several items

46. Write the missing line to delete the index no from 1 to 3 using slicing.

```
import pandas as pd
empno=[101,102,103,104,105,106,107]
p=pd.Series(empno)
```

_____

print(p)
output
0 101
4 105
5 106
6 107

Ans. p=p.drop(p.index[1:4])

PRACTICE QUESTIONS III

1. Given the following two series P1 and P2
Give the output of following command.
print(P1+P2)

P1		P2	
A	100	C	200
B	200	D	400
C	300	E	600
D	400	F	800
E	500	G	1000

Ans. A NaN
B NaN
C 500.0
D 800.0

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E 1100.0
F NaN
G NaN

2. Given the following two series P1 and P2
Give the output of following command.
print(P2-P1)

P1		P2	
A	100	C	200
B	200	D	400
C	300	E	600
D	400	F	800
E	500	G	1000

Ans.
A NaN
B NaN
C -100.0
D 0.0
E 100.0
F NaN
G NaN

3. Given the following Series S1
Give the output after execution of the following python statement print(S1*2)

S1	
1	10
2	15
3	30
4	35
5	50

Ans.
1 20
2 30
3 60
4 70
5 100

4. Write single line Pandas statements for each of the following.
(Assuming necessary modules have been imported):
(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.
[comptt 2020]

Ans.
(i) Packets = pd.Series([125, 92, 104, 92, 85, 116, 87, 90])
(ii) print(Packets.median())

5. Give the output:

Ans.
```
import pandas as pd
M=[15,-10,56,39,-90,15]
p=pd.Series(M,index=[10,20,30,40,50,60])
print('Sum=',p.sum())
print('Minimum value=',p.min())
print('Maximum value=',p.max())
print('Index value of Min value=',p.idxmin())
print('index value of Max Value=',p.idxmax())
print('count each value\n',p.value_counts())
```
Sum= 25
Minimum value= -90
Maximum value= 56
Index value of Min value= 50
index value of Max Value= 30
count each value

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15 2
56 1
-10 1
39 1
-90 1

6. Given the following Series S1 and S2:

S1		S2	
A	10	A	80
B	40	B	20
C	34	C	74
D	60	D	90

Write the command to find the sum of series S1 and S2 **1[SP 21]**

Ans. print(S1+S2)

7. Consider a given Series , M1: **2[SP 21]**

index

	Marks
Term1	45
Term2	65
Term3	24
Term4	89

Write a program in Python Pandas to create the series.

Ans.
```
import pandas as pd
m1=pd.Series([45,65,24,89],index=['term1','term2','term3','term4'])
```

8. Consider the following Series object, S_amt

Table	350
Chair	200
Sofa	800
Stool	150

(i) Write the command which will display the name of the furniture having rent>250.
(ii) Write the command to name the series as Furniture. **2[SP 21]**

Ans. (i) print(S_amt[S_amt>250])
(ii) S_amt.name= 'Furniture'

9. Consider two objects x and y. x is a list whereas y is a Series. Both have values 20, 40, 90, 110. What will be the output of the following two statements considering that the above objects have been created already

(i) print (x*2)
(ii) print(y*2)
Justify your answer **3[SP 21]**

Ans. (i) will give the output as:
[20,40,90,110,20,40,90,110]
(ii) will give the output as

0 40
1 80
2 180
3 220

Justification: In the first statement x represents a list so when a list is multiplied by a number, it is replicated that many number of times. The second y represents a series. When a series is multiplied by a value, then each element of the series is multiplied by that number.

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MULTIPLE CHOICE QUESTIONS

1. Select the correct statement

(a) import panda as pd (b) import pandas as pd (c) import pd as pandas (d) import pd as panda

2.
```
data ={'a':10.,'b':11.,'c':12.}
s =pd.Series(data)
```
index values of s is _____

(a) 0,1,2 (b) 10,11,12 (c) a,b,c (d) 10a,11b,12c

3. Pandas Series is a

(a) one-dimensional labeled array (b) two-dimensional labeled array

(c) three-dimensional labeled array (d) multi-dimensional labeled array

4.
```
s = pd.Series(20, index=[2, 3, 4, 5,6])
print (s)
```
will print 20 _____times

(a) 4 (b) 5 (c) 6 (d) 1

5. Give the output:
```
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.loc[1])
```
(a) 10 (b) 20 (c) 40 (d) 50

6. Give the output:

s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])print(s.iloc[1])

(a) 10 (b) 20 (c) 40 (d) 50

7. By default Series.tail() function display last ___ rows.

(a) 3 (b) 4 (c) 5 (d) 6

8. _____ function is used to delete an element from series.

(a) delete (b) drop (c) remove (d) pop

9. _____ method in Pandas can be used to change the index of rows and columns of a Series or Dataframe **[SP 2019-20]**

(a) rename() (b) reindex() (c) reframe() (d) none of these

10. Given a Pandas series called "S", the command which will display the last 4 rows is _____.

(a) print(S.tail(4)) (b) print(S.Tail(4)) (c) print(S.tails(4)) (d) print(S.Tails(4))

11. Given a Pandas series called "S", the command which will delete the 1st row(index value 0) _____.

(a) S.delete(0) (b) S.drop(0) (c) S.pop(0) (d) S.del(0)

12. Given a Pandas series called Sequences, the command which will display the first 4 rows is _____. **1 [SP 21]**

(a) print(Sequences.head(4)) (b) print(Sequences.Head(4))

(c) print(Sequences.heads(4) (d) print(Sequences.Heads(4))

13. Command to create empty Series is

(a) s=pd.emptySeires() (b) s=pd.Series(empty) (c) s=pd.Series() (d) s=pd.Series(NaN)

14. Gurjeet has created a Series S but forgot to give the index values. Choose the command that will be used to give index values

(a) S.newindex=[10,20,30,40,50] (b) S.index=[10,20,30,40,50]

(c) S.Series(index=[10,20,30,40,50]) (d) S.modifyindex=[10,20,30,40,50]

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15. Command to assign a name for the indexes

(a) S.indexname (b) S.name.index (c) S.index.name (d) S.nameindex

16. A Series represents _____ column(s) in memory.

(a) Single (b) Double (c) Multiple (d) all of these

17. Pandas Series is capable of holding _____data type.

(a) only integer (b) only string (c) only integer and string (d) any

18. Write single line Pandas statement to declare a Pandas series named Packets having tuple dataset as: 125, 92, 104, 92, 85, 116, 87, 90

(a) Packets = pd.Series((125, 92, 104, 92, 85, 116, 87, 90))

(b) Packets = pd.Series([125, 92, 104, 92, 85, 116, 87, 90])

(c) Packets = pd.Series({125, 92, 104, 92, 85, 116, 87, 90})

(d) None of the above

19. Write python series to print scalar value "10" 5 times

(a) s = pd.Series(10, index=[5]) (b) s = pd.Series(10, index=[10,5])

(c) s = pd.Series(10, index=[10*5]) (d) s = pd.Series(10, index=[11,12,13,14,15)

20. Write a single line command to create a series by given list C and index values C=['red','green','blue'] , index values=['r','g','b']

(a) p=pd.Series(C,index=['r','g','b']) (b) p=pd.Series(list=C,index=['r','g','b'])

(c) p=pd.Series(C) (d) p=pd.Series(values=C,index=['r','g','b'])

21. Aman wants to create the series with the following list and index values. He asked his friends for help and received muliple answers from friends. But one of the answers is incorrect, you have to identify the incorrect answer.
List=['Laptop','Pendrive','Harddisk']
index values=['L','P','H']

(a)
```
import pandas as pd
L=['Laptop','Pendrive','Harddisk']
p=pd.Series(list=L,index=['L','P','H'])
print (p)
```

(b)
```
import pandas as pd
L=['Laptop','Pendrive','Harddisk']
p=pd.Series(data=L,index=['L','P','H'])
print (p)
```

(c)
```
import pandas as pd
L=['Laptop','Pendrive','Harddisk']
p=pd.Series(L,index=['L','P','H'])
print (p)
```

(d)
```
import pandas as pd
L=['Laptop','Pendrive','Harddisk']
p=pd.Series(L,['L','P','H'])
print (p)
```

22. Two Seies M1 and M2 are given alongside.

M1			M2	
1	67		1	78
2	90		2	95
3	34		3	67
4	56		4	23
5	77		5	45

(i) Write code to display the sum of M1 and M2

(a) print (sum(M1,M2))

(b) print(M1+M2)

(c) print(M1.add(M2))

(d) print(M1.sum(M2))

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(ii) Write code to print the mean of all elements of M1

(a) print(M1.mean()) (b) print(mean(M1) (c) print(means(M1)) (d) print(M1.means())

(iii) Show rows where M1 greater than 75

(a) print(M1>75) (b) (print(M1[M1>75]) (c) print(M1>'75') (d) print(M1(M1>75))

(iv) Set the series name "Marks1" of M1 series

(a) M1.seriesname="Marks1" (b) M1.name="Marks1"

(c) M1.newname="Marks1" (d) M1.setname="Marks1"

23. A Series S is given below:

101 Harsh
102 Arun
103 Ankur
104 Harpahul
105 Divya
106 Jeet

With reference to the above question, write the answer.

(i) Choose the command that will give the following output

102 Arun
103 Ankur
104 Harpahul

(a) print(S.loc[2:4]) (b) print(S.iloc[1:4])

(c) print(S[1:3]) (d) print(S[102,103,104])

(ii) Delete the value against index 105. Help him to choose the suitable option to do so:

(a) S=S.delete(105) (b) S=S.remove(105)

(c) S=S.del(105) (d) S=S.drop(105)

(iii) Write the command which will display the rows having name="Ankur"

(a) print(S=="Ankur") (b) print(S[S."Ankur"])

(c) print(S[S=="Ankur"]) (d) print(S='Ankur")

(iv) Choose the command that will not give the following output

104 Harpahul
105 Divya
106 Jeet

(a) print(S.tail(3)) (b) print(S.loc[104:]) (c) print(S.iloc[3:6]) (d) print(S.iloc[-3:])

(v) Command to give the name "EMPCODE" to index values

(a) S.index.name="EMPCODE" (b) S.name.index="EMPCODE"

(c) S.indexname="EMPCODE" (d) S.nameindex="EMPCODE"

(vi) Change the index values to 1,2,3,4,5,6

(a) S.newindex=[1,2,3,4,5,6] (b) S.changeindex=[1,2,3,4,5,6]

(c) S.index=[1,2,3,4,5,6] (d) S.indexvalues=[1,2,3,4,5,6]

24. Pushp, a student of class-XII, has been assigned a code to create a panda series S1, as shown below. **[CBSE QB]**

a 100
b 200
c 300
d 400
e 500

dtype: int64

With reference to the above question, write the answer.

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(i) Choose the command that will give the following output

b 00
c 300
dtype: int64

(a) print(S1[:3]) (b) print(S1[0:3])
(c) print(S1[1:3]) (d) print(S1[2:4])

(ii) Help him to identify the correct statement that can be used to extract the value with the index 'c'

(a) print(S1[c]) (b) print(S1(c)) (c) print('S1' ['c']) (d) print(S1 ['c'])

(iii) Which of the following command will give the following output

b 200
d 400
dtype: int64

(a) print(S1.iloc[1:4]) (b) print(S1.iloc[2:4])
(c) print(S1.iloc(1:4)) (d) print(S1.iloc[1:4:2])

(iv) Which of the following command will display the series by adding 10 in each value.

(a) print(S1 [+10]) (b) print(S1+10)
(c) print(S1)+10 (d) print(S1)+print(10)

(v) Pushp wants to delete the value against index 'd'. Help him to choose the suitable option to do so:

(a) S1=S1.drop(d) (b) S1=S1.drop('d')
(c) S1=drop('d') (d) S1=S1.drop['d']

25. Answer the following program based on the series given below. **[CBSE QB]**

```
import pandas as pd
list1=[1,2,3,4,5,6,7,8]
list2=['swimming','tt','skating','kho kho', 'bb', 'chess', 'football',"cricket"]
school=pd.Series(list1,index=list2)
school.name=("little")
print (school*2)          #statement 1
print (school.tail(3))    #statement 2
print (school["tt"])      #statement 3
print (school[2:4])       #statement 4
```

(i) Choose the correct name of the series object given above.

(a) list1 (b) list2 (c) school (d) little

(ii) Choose the correct output for the statement:
print (school.tail(3)) # statement 2

(a) swimming 1
tt 2
skating 3

(b) chess 6
football 7
cricket 8

(c) 4

(d) kho kho 4
bb 5
chess 6
football 7
cricket 8

(iii) Choose the correct output for the statement:
print (school["tt"]). # statement 3

(a) 2 (b) 3 (c) tt 2 (d) true

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(iv) Identify the correct output for:print (school[2:4]) # statement 4.

(a) skating 3
kho kho 4

(b) tt 2
skating 3
kho kho 4

(c) skating 3
kho kho 4
bb 5

(d) skating 3
kho kho 4
bb 5
chess 6
football 7
cricket 8

(v) The correct output of the statetment:
print (school*2) # statement 1 will be.

(a) swimming 3
tt 4
skating 5
kho kho 6
bb 7
chess 8
football 9
cricket 10

(b) swimming 2
tt 4
skating 6
kho kho 8
bb 10
chess 12
football 14
cricket 16

(c) swimming False
tt False
skating True
kho kho True
bb True
chess True
football True
cricket True

(d) swimming 1
tt 4
skating 9
kho kho 16
bb 25
chess 36
football 49
cricket 64

ANSWERS

1. (b) **2.** (c) **3.** (a) **4.** (b) **5.** (d) **6.** (b) **7.** (c) **8.** (b) **9.** b **10.** (a)
11. (b) **12.** (a) **13.** (c) **14.** (b) **15.** (c) **16.** (a) **17.** (d) **18.** (a) **19.** (d) **20.** (a)
21. (a)
22. (i) (b) (ii) (a) (iii) (b) (iv) (b)
23. (i) (b) (ii) (d) (iii) (c) (iv) (c) (v) (a) (vi) (c)
24. (i) (c) (ii) (d) (iii) (d) (iv) (b) (v) (b)
25. (i) (d) (ii) (b) (iii) (a) (iv) (a) (v) (b)

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2 DataFrame

A pandas DataFrame is a two (or more) dimensional data structure – basically a table with rows and columns. The columns have names and the rows have indexes. For instance, the price can be the name of a column and 2,3 the price values.

A picture of a Pandas DataFrame is shown alongside:

	Item	Price
0	A	2
1	B	3

In general, you could say that the Pandas DataFrame consists of three main components: the data, the index, and the columns. A pandas DataFrame can be created using the following constructor pandas. DataFrame (data, index, columns, dtype, copy).

The parameters of the constructor are as follows:

Sr.No	Parameter	Description
1.	Data	Data takes various forms like ndarray, series, map, lists, dict, constants and also another DataFrame.
2.	index	For the row labels, the Index to be used for the resulting frame is Optional Default np.arrange(n) if no index is passed.
3.	columns	For column labels, the optional default syntax is - np.arrange(n). This is only true if no index is passed.
4.	dtype	Data type of each column
5.	copy	This command (or whatever it is) is used for copying data, if the default is False

CREATE DATAFRAME

A pandas DataFrame can be created using various inputs like:

- Lists
- Series
- Tuple
- Numpyndarrays
- Dictionary
- Another DataFrame

Create an Empty DataFrame

A basic DataFrame, which can be created is an Empty Dataframe.

1. Write python program to create an empty dataframe.

Ans.
```
import pandas as pd
df=pd.DataFrame()
print (df)
```
OUTPUT:
Empty DataFrame
Columns: [ ]
Index: [ ]

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Create a DataFrame from List

The DataFrame can be created using a single list or a list of lists.

2. Create a dataframe df from the given list lst
lst=[‘red’,’green’,’blue’,’yellow’]

Ans.
```
import pandas as pd
lst=['red','green','blue','yellow']
df=pd.DataFrame(lst)
print (df)
```
```
     0
0    red
1    green
2    blue
3    yellow
```

#Change index

In the last example, we did not pass any index, so by default, it assigned the indexes ranging from 0 to len(data)-1, i.e., 0 to 3. If you want to set new index values you can do it by using index attribue.

3. Modify the above program and set index value=r,g,b,y

Ans.
```
import pandas as pd
lst=['red','green','blue','yellow']
df=pd.DataFrame(lst,index=['r','g','b','y'])
print (df)
```
```
     0
r    red
g    green
b    blue
y    yellow
```

#With column name

As you can see in the above question, by default 0 column name is displayed. You can change the column name by using columns attribute.

4. Modify the above program and set the column name as ‘Colors’

Ans.
```
import pandas as pd
lst=['red','green','blue','yellow']
df=pd.DataFrame(lst,index=['r','g','b','y'],columns=["Colors"])
print (df)
```
```
     Colors
r    red
g    green
b    blue
y    yellow
```

#With list of lists

You can display more than one column in dataframe by using list of lists.

5. Karambir created a list(lst) of top 4 students in maths. He wants to show it in tabular form. Create a DataFrame by using list 1st with headings name and marks.
lst=[[‘Sanjay’,95],[‘Suman’,97],[‘Pahul’,88],[‘Divya’,72]]

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Ans.
```
import pandas as pd
lst=[['Sanjay',95],['Suman',97],['Pahul',88],['Divya',72]]
df=pd.DataFrame(lst,columns=['name','marks'])
print (df)
```
OUTPUT:

	name	marks
0	Sanjay	95
1	Suman	97
2	Pahul	88
3	Divya	72

#Change index values

6. Modify the above program and set the index valuees 1 to 4.

Ans.
```
import pandas as pd
lst=[['Nidhi',95],['Gurjeet',97],['Pahul',88],['Divya',72]]
df=pd.DataFrame(lst,columns=['name','marks'],index=[1,2,3,4])
print (df)
```
OR
```
import pandas as pd
lst=[["Nidhi",95],["Gurjeet",97],["Pahul",88],["Divya",72]]
inx=[1,2,3,4]
df=pd.DataFrame(lst,columns=['name','marks'],index=inx)
print (df)
```
OR
```
import pandas as pd
lst=[["Nidhi",95],["Gurjeet",97],["Pahul",88],["Divya",72]]
inx=[1,2,3,4]
df=pd.DataFrame(lst,columns=['name','marks'])
df.index=inx
print (df)
```

	name	marks
1	Nidhi	95
2	Gurjeet	97
3	Pahul	88
4	Divya	72

7. Create the following dataframe using list

	pcode	price
101	P1	40
102	P2	30
103	P3	69

Ans.
```
import pandas as pd
lst=[['P1',40],['P2',30],['P3',69]]
df=pd.DataFrame(lst,columns=['Pcode','Price'],index=[101,102,103])
print (df)
```

#Change data type

8. Change the datatype to float in the above program

Ans.
```
import pandas as pd
```

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```
lst=[['Nidhi',95],['Gurjeet',97],['Pahul',88],['Divya',72]]
df=pd.DataFrame(lst,columns=['name','marks'],index=[1,2,3,4],dtype=float)
print (df)
```

	name	marks
1	Nidhi	95.0
2	Gurjeet	97.0
3	Pahul	88.0
4	Divya	72.0

Create a DataFrame from Tuple

DataFrame can also be created by Tuple.

9. Create a dataframe df by using given tuple t(10,20,30).

Ans.
```
import pandas as pd
t=(10,20,30)
df=pd.DataFrame(t)
print (df)
```
output:

	0
0	10
1	20
2	3

Create a DataFrame from Dictionary

When dataframe is created by using Dictionary, keys of dictionary are set as columns of DataFrame. You can change the order of columns and store specified columns. If you try to change the column name, NaN will be displayed.

Note: Column name values must be same as dictionary keys.

10. Write python code to create a Dictionary Dic to store roll, name and marks of 3 students. Convert Dic into dataframe df and display the dataframe df.

Ans.
```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic)
print (df)
```

	roll	name	marks
0	1	a	24
1	2	b	53
2	3	c	66

Change columns position

You can change the positions of columns defined in dictionary by setting the order of columns with columns command.

11. Give the output

```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic,columns=['roll','marks','name'])
print (df)
```

Ans.

	roll	marks	name
0	1	24	a
1	2	53	b
2	3	66	c

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Take specific column(s)

Instead of storing all columns, you can set specified column(s) to dataframe.

12. From the Dictionary Dic set only roll and mark with dataframe df.

Ans.
```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic,columns=['roll','marks'])
print (df)
```

	roll	marks
0	1	24
1	2	53
2	3	66

when column name is not same as keys values: if Dictionary keys name is not same the dataframe columns name then it will display NaN values in dataframe column.

13. Give the output

```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic,columns=['roll','eng_marks'])
print (df)
```

Ans.

	roll	eng_marks
0	1	NaN
1	2	NaN
2	3	NaN

Create a DataFrame from Series

14. Write a python code to create a dataframe from the given series S.

Ans.
```
import pandas as pd
L=[1,2,3,4]
S=pd.Series(L)
df=pd.DataFrame(S,columns=['roll'])
print (df)
```

	roll
0	1
1	2
2	3
3	4

Create a DataFrame from Numpy ndarrays

15. Give the output

```
import pandas as pd
import numpy as np
data=np.array(['mon','tue','wed'])
p=pd.DataFrame(data,columns=['Month'])
print (p)
```

Ans.

	Month
0	mon
1	tue
2	wed

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With columns name and changed index values

16. Modify the above program set the column name 'DayName' and index values [1,2,3]

Ans.
```
import pandas as pd
import numpy as np
data=np.array(['mon','tue','wed'])
p=pd.DataFrame(data,columns=['DayName'],index=[1,2,3])
print (p)
```

Day	Name
1	mon
2	tue
3	wed

ATTRIBUTES OF DATAFRAME

We have learned what a DataFrame is and how to create one. Now we will study about "Attributes of DataFrame", which are useful to fetch information related to a particular DataFrame.

SYNTAX

<DataFrameObject>. <attribute_name>

Some attributes are:

(i) Index (ii) Columns (iii) Axes (iv) Dtypes (v) Size
(vi) Shape (vii) Ndim (viii) Empty (ix) T

We will explain all these attributes by using the dataframe given below import pandas as pd

```
d={'Rollno':(1,2,3,4),'Name':('Aman','Preeti','Kartik','Lakshay'),'
            CGPA':(8.7,8.9,9.2,9.4),'Stream': ('Science','Arts','Science','Commerce')}
df=pd.DataFrame(d,index=['st1','st2','st3','st4'])
print(df)
```

OUTPUT:

	Rollno	Name	CGPA	Stream
St1	1	Aman	8.7	Science
St2	2	Preeti	8.9	Arts
St3	3	Kartik	9.2	Science
St4	4	Lakshay	9.4	Commerce

(i) index : This attribute is used to fetch the index's names, if index name is given then it would be the same names given to dataframe as in our example, indexes are: st1,st2,st3,st4 otherwise as default index names 0,1,2,3 and so on.

print(df.index)

OUTPUT:

Index(['st1', 'st2', 'st3', 'st4'], dtype='object')

(ii) Columns : This attribute is used to fetch the column's names, as in this case it should give column name as: Rollno,Name,CGPA,Stream.

print(df.columns)

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OUTPUT

Index(['Rollno', 'Name', 'CGPA', 'Stream'], dtype='object')

(iii) Axes: This attribute is used to fetch both index and column names.

print(df.axes)

OUTPUT:

[Index(['st1', 'st2', 'st3', 'st4'], dtype='object'), Index(['Rollno', 'Name', 'CGPA', 'Stream'], dtype='object')]

you can use axes[0] to fetch the index names as same output get by index attributes.

print(df.axes[0])

OUTPUT:

index(['st1', 'st2', 'st3', 'st4'], dtype='object')

axes[1] can be used to fetch column's names same as by columns attributes.

print(df.axes[1])

OUTPUT:

Index(['Rollno', 'Name', 'CGPA', 'Stream'], dtype='object')

(iv) dtypes: This attribute is used to fetch the data type values of the items in the DataFrame.

print(df.dtypes)

OUTPUT:

Rollno	int64
Name	object
CGPA	float64
Stream	object
dtype:	object

(v) size: This attribute is used to fetch the size of the DataFrame, which is the product of the number of rows and columns.Here, in our example we have 4 rows and 4 columns, so 4*4 i.e. 16 is the size of our DataFrame.

print(df.size)

OUTPUT:

16

(vi) shape: This attribute returns the number of rows and number of columns available in dataframe. In our case there are 4 rows and 4 columns in dataframe so it will return (4,4)

print(df.shape)

OUTPUT:

(4,4)

(vii) ndim: This attribute is used to fetch the dimension of the given DataFrame. Like if it is 1-D, 2-D, or 3-D. We are working on 2-D Data Structure so it will return 2.

print(df.ndim)

OUTPUT:

2

(viii) empty: This attribute gives you a Boolean output in the form of true or false, if dataframe is empty it will return true otherwise false.

print(df.empty)

OUTPUT

False

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(ix) T: This attribute is used to transpose the DataFrame; i.e., rows become columns and columns become rows
print(df.T)

OUTPUT:

	st1	st2	st3	st4
Rollno	1	2	3	4
Name	Aman	Preeti	Kartik	Lakshay
CGPA	8.7	8.9	9.2	9.4
Stream	Science	Arts	Science	Commerce

ACCESSING DATA

Accessing using head()

By default head() function display top 5 rows. To print n no of top rows, pass n as parameter i.e. Dataframe. head(n)

17. Give the output:

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104,105,106),'grade':('a','b','a','c','b','c'),'dept':
('sales','pur','mar','sales','pur','mar')}
df=pd.DataFrame(Dic)
print(df.head(3))
```

	empno	grade	dept
0	101	a	sales
1	102	b	pur
2	103	a	mar

18. Give the output

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104,105,106),'grade':('a','b','a','c','b','c'),'dept':
('sales','pur','mar','sales','pur','mar')}
df=pd.DataFrame(Dic)
print(df.head()[['empno','dept']])
```

	empno	dept
0	101	sales
1	102	pur
2	103	mar
3	104	sales
4	105	pur

This above code first selects the first 5 rows of our data set. And then it takes only the 'empno' and the 'dept' columns, when value of passed parameter in head function is larger than the no of rows available in dataframe.

19. What will be displayed when you passed any 'n' value in head function to display top 'n' rows but no of rows in dataframe is less than 'n' value?

Ans. In this case it will display maximum rows(all rows). In the above example, if we write print(df.head(10)) then all the rows(6 rows) will be displayed.

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Accessing using tail()

By tail() function display last 5 rows. To print n no of last rows, pass n as parameter i.e.DataFrame.tail(n)

20. Give the output

```
import pandas as pd
Dic={'empno':(101,102,103,104,105,106),'grade':('a','b','a','c','b','c'),'dept':
('sales','pur','mar','sales','pur','mar')}
df=pd.DataFrame(Dic)
print(df.tail())
```

Ans.

	empno	grade	dept
1	102	b	pur
2	103	a	mar
3	104	c	sales
4	105	b	pur
5	106	c	mar

PRACTICE QUESTIONS I

1. Write a suitable Python code to create an empty dataframe. **[SP 2019-20]**

Ans.

```
import pandas as pd
df=pd.DataFrame()
print(df)
```

2. Hitesh wants to display the last four rows of the dataframe df and has written the following code :

df.tail()

But last 5 rows are being displayed. Identify the error and rewrite the correct code so that last 4 rows get displayed. **[sp 2019-20]**

Ans. df.tail(4)

3. Write a python code to create a dataframe with appropriate headings from the list given below **[SP 2019-20]**

['S101', 'Amy', 70], ['S102', 'Bandhi', 69], ['S104', 'Cathy', 75], ['S105','Gundaho', 82]

Ans.

```
import pandas as pd
data = [['S101', 'Amy', 70], ['S102', 'Bandhi', 69], ['S104','Cathy', 75], ['S105',
'Gundaho', 82]]
df = pd.DataFrame(data, columns = ['ID', 'Name', 'Marks'])
print(df )
```

OR

```
import pandas as pd
data = {'ID':['S101', 'S102','S104','S105'],'Name':['Amy',
'Bandhi','Cathy','Gundaho'],'Marks':[70,69,75,82]}
df = pd.DataFrame(data)
print(df )
```

4. Write a python code to create a dataframe from the list given below with "Marks" heading

L=[29,42,55,22,84,56]

Ans.

```
import pandas as pd
L=[29,42,55,22,84,56]
df=pd.DataFrame(L,columns="Marks")
```

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5. Write python code to create the data frame that looks like this:

	Empno	Dept
0	101	sales
1	102	marketing

(i) using Dictionary (ii) using List

Ans. (i)
```
import pandas as pd
dic={'empno':(101,102),'Dept':('sales','marketing')}
df=pd.DataFrame(dic)
print(df)
```
(ii)
```
import pandas as pd
L=[[101,'sales'],[102,'marketing']]
df=pd.DataFrame(L,columns=['Empno','Dept'])
print(df)
```

6. Give the output

(i)
```
import pandas as pd
L=[10,20,30,40,50]
df=pd.DataFrame(L)
print(df)
```
(ii)
```
import pandas as pd
L=[[10,20,30,40,50]]
df=pd.DataFrame(L)
print(df)
```

Ans. (i)

	0
0	10
1	20
2	30
3	40
4	50

(ii)

	0	1	2	3	4
0	10	20	30	40	50

7. Write python code to create the dataframe emp using dictionary:

	Name	Salary
101	Rohan	200000
102	Aman	250000

Ans.
```
import pandas as pd
emp = pd.DataFrame({'Name':['Rohan','Aman'],'Salary':[20000,25000]},index=[101,102]);
print(emp)
```
or
```
import pandas as pd
Dic= {'Name':['Rohan','Aman'],'Salary':[20000,25000]}
emp = pd.DataFrame(Dic,index=[101,102]);
print(emp)
```

8. Write python code to display top 3 records from DataFrame DF

Ans. DF.head(3)

9. Fill in the blank:
```
import pandas as pd
```

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```
import numpy as np
data=____.array(['red','green','blue'])
___=____.DataFrame(____)
print (p)
```

Ans.
```
import pandas as pd
import numpy as np
data=np.array(['mon','tue','wed'])
p=pd.DataFrame(data)
print (p)
```

10. Find the errors and rewrite the corrected program
```
import pd as pandas
lst=['red','green','blue','yellow']
df=pd.dataframe(lst,index=['r','g','b','y'],headings=['Colour'])
print (df)
```

Ans.
```
import pandas as pd
lst=['red','green','blue','yellow']
df=pd.DataFrame(lst,index=['r','g','b','y'],columns=['Colour'])
print (df)
```

11. Write a small python code to create a dataframe with headings (a and b) from the list given below:
[[1,2],[3,4],[5,6],[7,8]] **[SP 2019-20]**

Ans.
```
import pandas as pd
L=[[1,2],[3,4],[5,6],[7,8]]
df = pd.DataFrame(L,columns = ['a','b'])
print(df)
```

	a	b
0	1	2
1	3	4
2	5	6
3	7	8

OR

```
import pandas as pd
Dic={'a':[1,3,5,7],'b':[2,4,6,8]}
df = pd.DataFrame(Dic)
print(df)
```

12. Find the output of the following code: **[SP 2019-20]**
```
import pandas as pd
data = [{'a': 10, 'b': 20},{'a': 6, 'b': 32, 'c': 22}]
df1 = pd.DataFrame(data, index=['first', 'second'], columns=['a', 'b'])
df2 = pd.DataFrame(data, index=['first', 'second'], columns=['a', 'b1'])
print(df1)
print(df2)
```

Ans.

a	b	
first	10	20
second	6	32

	a	b1
first	10	NaN
second	6	NaN

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COLUMNS IN DATAFRAME

Column Selection

21. Sangeeta has created a dataframe with columns- name and marks but wants to display only name column. She has written the code but getting some errors, help sangeeta and recifty the errors.

```
import pandas as pd                                    #statement 1
lst=[['Nidhi',95],['Gurjeet',97],['Pahul',88],['Divya',72]]  #statement 2
df=pd.DataFrame(lst,columns=['name','marks'])  #statement 3
print (name)  #statement 4
```

Ans. error in statement 4

print (df['name'])

OUTPUT

0	Nidhi
1	Gurjeet
2	Pahul
3	Divya

When column name does not exist: What would be the result if you try to access coulumn(s) which does not exist in dataframe? In the above example if we try to access 'rollno' column, key error will be raised.

```
print(df['rollno'])
```

OUTPUT:

KeyError: 'rollno'

Adding New Column

(i) Direct Method: You can add new column by simply passing the new column name to dataframe and assign new values. This is the simplest method to add new column, but new column will be added only at the last position of the dataframe

Syntax:

dataframe[new column name]=assign new values

22.
```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic)
_________________ #statement 1
print(df)
```

Fill the statement 1 to add new column age in dataframe df with some values

Ans. df['age']=[18,20,19]

OUTPUT

	roll	name	marks	age
0	1	a	24	18
1	2	b	53	20
2	3	c	66	19

If length of new column value is bigger/smaller than length of index then it'll raise Value error : Length of values does not match length of index.

Consider the above example, if we assign four values to age column instead of three values:

df['age']=[18,20,19,17] then ValueError will be raised.

OUTPUT:

ValueError: Length of values (4) does not match length of index (3)

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23. Write single line satetement to add new column 'Sales' in dataframe COMPANY with [50000,20000,45000,84000] values.

Ans. COMPANY['Sales']= [50000,20000,45000,84000]

24. Create the dataframe "EMP"

Names	Basic	Da	Hra
Sanya	9500	3000	2000
Krish	7000	5000	1900
Rishav	9650	1500	2100
Deepak	7500	2000	2700
Kriti	9200	1800	500

Perform the following operations on the DataFrame :

1. Calulate sum of Basic, Da and Hra and assign to column "Salary"
2. Disply Dataframe
3. Display the name of columns
4. Count the no of columns.

Ans.
```
import pandas as pd
EMP = pd.DataFrame({'Names':('Sanya','Krish','Rishav','Deepak','Kriti'),'Basic':(9500,
7000, 9650, 7500, 9200),'Da' : (3000, 5000, 1500, 2000, 1800),'Hra' : (2000, 1900,
2100, 2700, 500)})
1. EMP['Salary']=EMP.Basic+EMP.Da+EMP.Hra
2. print(EMP)
3. print(EMP.axes[1])              # or print(EMP.columns)
4. print("no of columns",len(EMP.axes[1]))
```

Output

	Names	Basic	Da	Hra	Salary
0	Sanya	9500	3000	2000	14500
1	Krish	7000	5000	1900	13900
2	Rishav	9650	1500	2100	13250
3	Deepak	7500	2000	2700	12200
4	Kriti	9200	1800	500	11500

Index(['Names', 'Basic', 'Da', 'Hra', 'Salary'], dtype='object')

no of columns 5

25. Write a single line command to calculate 10% from 'sale' column from dataframe df and assign to new column 'Commission'

Ans. df['Commission']=df.sale*10/100

(ii) Using insert function : By using insert function you can insert new column at any position in dataframe.

26. Write code to add new column age at 3rd location using insert function.

Ans.
```
import pandas as pd
a=[18,20,19]
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic)
print(df)
df.insert(3,'age',a)      # or df.insert(loc=3,column='age',value=a) or
df.insert(3.'age',[18,20,19])
print(df)
```

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OUTPUT:

	roll	name	marks
0	1	a	24
1	2	b	53
2	3	c	66

	roll	name	marks	age
0	1	a	24	18
1	2	b	53	20
2	3	c	66	19

(iii) Using loc:

27. Write the code to add new column 'age' in dataframe df using .loc

Ans.
```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic)
df.loc[:,'age']=[18,20,19]
print(df)
```

OUTPUT

	roll	name	marks	age
0	1	a	24	18
1	2	b	53	20
2	3	c	66	19

The colon indicates that we want to select all the rows. In the column part, we specify the labels of the columns to be selected. Since the dataframe does not have column 'age', Pandas creates a new column.

Column Deletion

#using del function: del can be used to delete any column from dataframe.

Syntax:

del dtaframe[columnname]

del operates only on one at a time. del is an in-place operation only.

28. Give the output

```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
inx=['A1','A2','A3','A4']
df=pd.DataFrame(Dic,index=inx)
print(df)
del df['name']
print(df)
```

Ans.

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

	empno	salary
A1	101	3000
A2	102	5000
A3	103	8000
A4	104	9000

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 # using drop()

Drop() function: It accepts a single Label Name or list of Labels and deletes the corresponding columns or rows (based on axis) with that label. To drop column, we need to provide axis=1 as another argument to drop function. By default it doesn't modify the existing DataFrame, instead it returns a new dataframe. Set the value inplace=True if you need to drop column in existing dataframe otherwise changes will not take effect in existing dataframe or you can simply return the changes in new dataframe.

29. What is the difference between del and drop?

Ans. Difference between:

S.N.	del	drop
(i)	del operates on column only.	drop operates on both columns and rows.
(ii)	del operates only on one at a time.	drop can operate on multiple items at a time.
(iii)	del is an in-place operation only.	drop can operate in-place or return a copy.

30. Write program to delete the column name from dataframe df using drop function, changes should take effect in existing dataframe.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
inx=['A1','A2','A3','A4']
df=pd.DataFrame(Dic)
df.index=inx
print(df)
df.drop('name',1,inplace=True)    #or  df.drop('name',axis=1,inplace=True)  or  df=df.drop('name',1)
print(df)
```

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

	empno	salary
A1	101	3000
A2	102	5000
A3	103	8000
A4	104	9000

31. Write single line command to delete the column 'name' from dataframe df using drop function, changes should take effect in new dataframe.

Ans.
```
df1=df.drop('name',1)
```

 # using drop (multiple columns)

32. Write program to delete name and salary column from dataframe df using drop function.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
inx=['A1','A2','A3','A4']
df=pd.DataFrame(Dic,index=inx)
df=df.drop(['name','empno'],1)          # df=df.drop(['name', 'empno'],axis=1)
print(df)
```

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	salary
A1	3000
A2	5000
A3	8000
A4	9000

#using drop(columns=[colnames]): Instead of giving axis=1, you can choose columns option in drop function to delete the column.

33. Modify the above program and delete the columns using columns option in drop function.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
inx=['A1','A2','A3','A4']
df=pd.DataFrame(Dic)
df.index=inx
df=df.drop(columns=['name','empno'])
print(df)
```

	salary
A1	3000
A2	5000
A3	8000
A4	9000

 # By overwriting : One more option is to delete the column is overwriting the existing columns with new columns

34. Write the program to delete the column 'name' in dataframe df using overwriting.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
inx=['A1','A2','A3','A4']
df=pd.DataFrame(Dic)
df.index=inx
print(df)
df=df[['salary','empno']]     #overwriting
print(df)
```

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

	salary	empno
A1	3000	101
A2	5000	102
A3	8000	103
A4	9000	104

Column rename

You can change the column(s) name of dataframe.

#By columns attribute: Columns attribute is used to change all columns name.

35. Change the columns name "a" and "b" to "A" and "B"

Ans.
```
import pandas as pd
df = pd.DataFrame({"a": [1, 2, 3], "b": [4, 5, 6]})
print(df)
df.columns = ['A','B']
print(df)
```

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```
   a  b
0  1  4
1  2  5
2  3  6
   A  B
0  1  4
1  2  5
2  3  6
```

#By rename() function: Rename() is used to rename specific column(s) or all columns.
df.rename(columns={'oldName1': 'newName1', 'oldName2': 'newName2'}, inplace=True)

36. Change the column name 'b' to 'B' using rename() function

Ans.
```
import pandas as pd
df = pd.DataFrame({'a': [1, 2, 3], 'b': [4, 5, 6]})
print(df)
df.rename(columns={'b': 'B'},inplace=True)
print(df)
```
```
   a  b
0  1  4
1  2  5
2  3  6
   a  B
0  1  4
1  2  5
2  3  6
```

Set the value inplace=True if you need to do changes in column name in existing dataframe otherwise changes will not take effect in existing dataframe or you can simply return the changes in new dataframe as shown in the example given below.

```
import pandas as pd
df = pd.DataFrame({'a': [1, 2, 3], 'b': [4, 5, 6]})
print(df)
df1=df.rename(columns={'b': 'B'})
print(df1)
```

Change all column names

37. Write python code to change all column names using rename function.

Ans.
```
import pandas as pd
df = pd.DataFrame({"a": [1, 2, 3], "b": [4, 5, 6]})
print(df)
df.rename(columns={"a": "A", "b": "B"})
print(df)
```
```
   a  b
0  1  4
1  2  5
2  3  6
   a  b
0  1  4
1  2  5
2  3  6
```

Not geting the desired output? Because inplace=True is not given

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Remember to specify inplace=True:

```
import pandas as pd
df = pd.DataFrame({"a": [1, 2, 3], "b": [4, 5, 6]})
print(df)
df.rename(columns={"a":"A", "b": "B"}, inplace=True)
print(df)
```

```
   a  b
0  1  4
1  2  5
2  3  6
   A  B
0  1  4
1  2  5
2  3  6
```

#Other method: Another method can be used to raname the column name using rename() without columns option. Specify the axis=1 or axis='columns' with rename function.

df.rename({'oldName1': 'newName1', 'oldName2': 'newName2'}, axis=1,inplace=True)

OR

df.rename({'oldName1': 'newName1', 'oldName2' : 'newName2'}, axis= 'columns',inplace=True)

38. Give the output of the following program

```
import pandas as pd
df = pd.DataFrame({'a': [1, 2, 3], 'b': [4, 5, 6]})
print(df)
df.rename({'a': 'X', 'b': 'Y'}, axis=1, inplace=True)
print(df)
```

Ans.

```
   a  b
0  1  4
1  2  5
2  3  6
   X  Y
0  1  4
1  2  5
2  3  6
```

ROWS IN DATAFRAME

Row Selection

#By using loc function : loc is used for indexing or selecting based on name, i.e. by row name and column name.

Specified row

39. Write python code to display the 1st record of employee from dataframe df.

Ans.

```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
print(df.loc['A1'])
```

OUTPUT:

```
empno     101
name      a
salary    3000
Name: A1, dtype: object
```

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By Slicing

40. Display the records of employees having index value A1 to A3 using loc.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
inx=['A1','A2','A3','A4']
df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
print(df.loc['A1':'A3'])  #including upper
```

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000

Multiple rows

41. Display the information of index value A1 and A3 from dataframe df.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
inx=['A1','A2','A3','A4']
df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
print(df.loc[['A1','A3']])
```

	empno	name	salary
A1	101	a	3000
A3	103	c	8000

Selecting all of the rows and some columns

42. Display name and salary of all employees from dataframe df.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
print(df.loc[:,['name','salary']])          or  print(df[['name','salary']])
```

	name	salary
A1	a	3000
A2	b	5000
A3	c	8000
A4	d	9000

Some rows and columns

43. Modify the print statement in above program to display name and salary of index value A2 and A3.

Ans.
```
print(df.loc['A2':'A3',['name','salary']])# or print(df loc[['A2','A3'],['name','salary']])
```

	name	salary
A2	b	5000
A3	c	8000

#by integer location(.iloc()) Rows can be selected by passing integer location to an iloc function.

.iloc [0:r, 0:c] – is used to select or index rows based on their position from 0 to r-1 rows and 0 to c-1 columns

44. A dataframe df is given below:

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

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Specified Row

(i) Write print statement to display information for empno 103.

Ans.
```
print(df.iloc[2])
```
or
```
print(df.loc['A3'])
```
OUTPUT:

empno 103
name c
salary 8000
Name: A3, dtype: object

Multiple Rows Selection

(ii) Write print statement to show information for empno 101 and 102.

Ans.
```
print(df.iloc[0:2])     #upper not included
```
OUTPUT:

	empno	name	salary
A1	101	a	3000
A2	102	b	5000

All Rows Some Columns

(iii) Display the name and salary of all employee using.iloc()

Ans.
```
print(df.iloc[:,1:3])
```
OR
```
print(df.iloc[:,1:])
```
OR
```
print(df.iloc[:,[1,2]])
```
OUTPUT:

	name	salary
A1	a	3000
A2	b	5000
A3	c	8000
A4	d	9000

Some Rows Some Columns

(iv) Display the salary of employee no 102 and 103.

Ans.
```
print(df.iloc[1:3,2:])
```
OR
```
print(df.iloc[[1,2],2])
```
OR
```
print(df.iloc[1:3,2:3])
```

	salary
A2	5000
A3	8000

(v) Display the salary of empno 102.

Ans.
```
print(df.iloc[1,2])     # 2nd row 3rd column
```
OR
```
print(df.loc['A2','salary'])
```
OUTPUT:

5000

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#Filtering the records

45. Display the information whose salary is greater than 5500.

Ans.
```
print(df[df.salary>5500])     #or  print(df[df['salary']>5500])
```
OUTPUT

	empno	name	salary
A3	103	c	8000
A4	104	d	9000

46. Write a single line statement to show all records from dataframe stud having marks>50.

Ans.
```
print(stud[stud['marks']>50])
```
OR
```
print(stud[stud.marks>50])
```

Adding new Rows

#By loc

47. Write code to add new row at the end of dataframe.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=[1,2,3,4])
df.loc[5]=[105,'e',6000]        # or df.loc[df.index.max()+1] = [105,'e',6000]   or
df.loc[len(df)+1]=[105,'e',6000]
print(df)
```
OUTPUT

	empno	name	salary
1	101	a	3000
2	102	b	5000
3	103	c	8000
4	104	d	9000
5	105	e	6000

#By append function: This function will append the rows at the end.

48. Write code to add new row at the end by using append method.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=[1,2,3,4])
df=df.append({'empno':105,'name':'e','salary':878},ignore_index=True)
print(df)
```

	empno	name	salary
0	101	a	3000
1	102	b	5000
2	103	c	8000
3	104	d	9000
4	105	e	878

Remember to specify ignore_index=True:

49. Create two dataframe df and df1 with same column name. Merge df1 with df and show the new values of df.

Ans.
```
import pandas as pd
lst=[['Sanjay',95],['Suman',97],['Pahul',88],['Divya',72]]
lst1=[['Karun',98],['Arjun',56]]
df=pd.DataFrame(lst,columns=['name','marks'])
```

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```
df1=pd.DataFrame(lst1,columns=['name','marks'])
df=df.append(df1)
print(df)
```

	name	marks
0	Sanjay	95
1	Suman	97
2	Pahul	88
3	Divya	72
0	Karun	98
1	Arjun	56

As you can see in output index value is repeated because ignore_index=True is not given. To get the index value in continous set ignore_index=True as shown in the example given below.

```
import pandas as pd
lst=[['Sanjay',95],['Suman',97],['Pahul',88],['Divya',72]]
lst1=[['Karun',98],['Arjun',56]]
df=pd.DataFrame(lst,columns=['name','marks'])
df1=pd.DataFrame(lst1,columns=['name','marks'])
df=df.append(df1,ignore_index=True)
print(df)
```

	name	marks
0	Sanjay	95
1	Suman	97
2	Pahul	88
3	Divya	72
4	Karun	98
5	Arjun	56

Deletion of Rows

using drop()

To drop row/index, we need to provide axis=0 as another argument to drop function. By default it doesn't modify the existing DataFrame, instead it returns a new dataframe.

#By Label Index Value

50. Write a single line statement to delete rows 2nd & 3rd (index values – 2, 3)

```
import pandas as pd
lst=[['Nidhi',95],['Gurjeet',97],['Pahul',88],['Divya',72]]
df=pd.DataFrame(lst,columns=['name','marks'],index=[1,2,3,4])
print(df)
```

Ans.
```
df=df.drop([2,3],axis=0)
print(df)
```

OR

```
df=df.drop(index=[2,3])
```

	name	marks
1	Nidhi	95
2	Gurjeet	97

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3	Pahul	88
4	Divya	72

	name	marks
1	Nidhi	95
4	Divya	72

51. Write single line code to delete the row whose index value is A1 from dataframe EMP.

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Ans.
```
EMP=EMP.drop('A1')       #or  EMP.drop('A1',inplace=True)
```

52. Modify the above code to delete the rows of index values 'A1' and 'A2'.

Ans.
```
EMP=EMP.drop(['A1','A2'])
```
OUTPUT

	empno	name	salary
A3	103	c	8000
A4	104	d	9000

#By index number

53. Give the output

```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
df=df.drop(df.index[[2,3]])
print(df)
```

Ans. OUTPUT

	empno	name	salary
A1	101	a	3000
A2	102	b	5000

#By overwriting : In this method, all elements except deleted elements will be overwritten to exising dataframe.

54. Modify the above code and delete rows those getting 5000 salary

Ans.
```
df=df[df.salary!=5000]
```

Rename index(row name) values

#by rename() : function is used to Change Column Names and Row Indexes

55. Give the output

```
import pandas as pd
lst=[['Nidhi',95],['Gurjeet',97],['Pahul',88],['Divya',72]]
df=pd.DataFrame(lst,columns=['name','marks'],index=[1,2,3,4])
print (df)
df.rename(index={1:'one',2:'two'},inplace=True)
print(df)
```

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Ans. OUTPUT

	name	marks
1	Nidhi	95
2	Gurjeet	97
3	Pahul	88
4	Divya	72

	name	marks
one	Nidhi	95
two	Gurjeet	97
3	Pahul	88
4	Divya	72

#other method: Another method can be used to rename the column name using rename() without columns option. Specify the axis=0 or axis='rows' with rename function.

df.rename({'oldName1': 'newName1', 'oldName2': 'newName2'}, axis=0,inplace=True)

56. Give the output

```
import pandas as pd
df = pd.DataFrame({'a': [1, 2, 3], 'b': [4, 5, 6]})
print(df)
df.rename(index={0:'x',1:'y',2:'z'},inplace=True)
print(df)
```

Ans. OUTPUT

	a	b
0	1	4
1	2	5
2	3	6

	a	b
x	1	4
y	2	5
z	3	6

57. Write the correct output on execution of the following Pandas code:

```
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)                    2[comptt 2020]
```

Ans.

	PID	PNAME
A	P01	Pen
B	P02	Pencil
C	P03	Eraser

58. 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?

Ans. Pandas rename() method is used to rename any index or column. The mapper parameter takes a dict-like Key:Value pair with Keys as previous names and Values with new names. Axis =1 represents that the mapper is to rename the columns with the new names mentioned in the mapper dictionary.

No, the mapper and columns parameter cannot be used together in a rename() method. Either mapper with axis=1 or columns is to be used.

Change Column Names and Row Indexes Simultaneously

59. Give the output

```
import pandas as pd
```

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```
lst=[['Nidhi',95],['Gurjeet',97],['Pahul',88],['Divya',72]]
df=pd.DataFrame(lst,columns=['name','marks'],index=[1,2,3,4])
df.rename(index={1:'one',2:'two'},columns={'name':'stu_name'},inplace=True)
print(df)
```

Ans. OUTPUT

stu_name		marks
one	Nidhi	95
two	Gurjeet	97
3	Pahul	88
4	Divya	72

MODIFICATION OF RECORDS

60. Consider the dataframe "EMP"

	Name	Basic	Da	Hra
E1	Sanya	9500	3000	2000
E2	Krish	7000	5000	1900
E3	Rishav	9650	1500	2100
E4	Deepak	7500	2000	2700
E5	Kriti	9200	1800	500

Give command to:

(i) Change the Da of Krish to 8000

(ii) Change the name 'Rishav' to 'Rishab'

(iii) increase the Hra of all employees by 200

Ans. (i) EMP.iloc[1,2]=8000 # orEMP.loc['E2','Da']=8000

(ii) EMP.iloc[2,0]='Rishab' #or EMP.loc['E3','Name']='Rishab'

(iii) EMP.Hra=EMP.Hra+200 #orEMP['HRA']=EMP['HRA']+200 or EMP.loc[:,'Hra"]+=200
print(EMP)

OUTPUT

	Name	Basic	Da	Hra
E1	Sanya	9500	3000	2200
E2	Krish	7000	8000	2100
E3	Rishab	9650	1500	2300
E4	Deepak	7500	2000	2900
E5	Kriti	9200	1800	700

61. Consider a dataframe STOCK created with the following information. Write single line Pandas statements for each of (i), (ii) and (iii).

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

(i) To change the 'ID' 1007 to 1010 in the 3rd row (i.e. for index 2)

(ii) To display the rows where 'ID' in the stock is greater than 1002 and 'Quantity' is less than 300

(iii) To change the Quantity of Pen to 800

(iv) To display the rows where 'ID' in the stock is greater than 1002 or 'Quantity' is less than 300

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Ans. (i) STOCK.loc[2,'ID']=1010 #or STOCK.iloc[2,1]=1010

(ii) print(STOCK[(STOCK['ID'] >1002) & (STOCK['QUANTITY'] < 300)])

or

print(STOCK[(STOCK.ID >1002) & (STOCK.QUANTITY < 300)])

(iii) STOCK.iloc[0,2]=800 #or STOCK.loc[0,'QUANTITY']=800

(iv) print(STOCK[(STOCK.ID >1002) | (STOCK.QUANTITY < 300)])

BOOLEAN INDEXING

62. Give the output

```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=['True','False','True','False'])
print(df)
```

Ans. OUTPUT

	empno	name	salary
True	101	a	3000
False	102	b	5000
True	103	c	8000
False	104	d	9000

Access Boolean Indexing using .loc

63. Give the output

```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=['True','False','True','False'])
print(df.loc['True'])
```

Ans. OUTPUT

	empno	name	salary
True	101	a	3000
True	103	c	8000

PRACTICE QUESTIONS II

1. Write the command using Insert() function to add a new column in the last place(3rd place) named "Salary" from the list Sal=[10000,15000,20000] in an existing dataframe named EMP already having 2 columns **[sp 2019-20]**

Ans.
```
EMP.insert(loc=2,column="Salary",value=Sal)
```
OR
```
EMP.insert(2,"Salary",Sal)
```
OR
```
EMP.insert(2,"Salary", [10000,15000,20000])
```

2. Write the command without using Insert() function to add a new column in the last place(3rd place) named "Salary" from the list Sal=[10000,15000,20000] in an existing dataframe named EMP already having 2 columns.

Ans.
```
EMP['Salary']=Sal
```
OR
```
EMP['Salary']=[10000,15000,20000]
```

3. Write the command using loc() to add a new column in the last place(3rd place) named "Salary" from the list Sal=[10000,15000,20000] in an existing dataframe named EMP already having 2 columns.

Ans.
```
EMP.loc[:,'Salary']=Sal
```

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OR

```
EMP.loc[:,'Salary']= [10000,15000,20000]
```

4. Write a small python code to drop a column "address" from dataframe stud using del.

Ans.
```
del stud["address"]
```

5. Write a small python code to drop a column "address" from dataframe stud using drop function.

```
stud=stud.drop('address',1)
```

OR

```
stud=stud.drop('address',axis=1)
```

OR

```
stud.drop('address',axis=1,inplace=True)
```

6. Aman wants to delete coloumn "admno" from school dataframe. He has written the following code school. drop("admno")
print(school)
But not getting the result. Help Aman to rectify the errors in code.

Ans. school=school.drop("admno",1) or school.drop("admno",1,inplace=True)
print(school)

7. Write a small python code to drop a row from dataframe labeled as 0. **[SP 2019-20]**

Ans.
```
df = df.drop(0)
print(df )
```

8. Give the output

```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic)
print (df[['roll','name']])
```

Ans. OUTPUT

	roll	name
0	1	a
1	2	b
2	3	c

9. Write the command to display Pid,Price from an existing dataframe named PRODUCT having 4 columns =[Pid, Pname,Price,Qty]

Ans. print (PRODUCT[['Pid','Price']])

10. Give the output:

```
import pandas as pd
Dic={'roll':(1,2,3),'name':('a','b','c'),'marks':(24,53,66)}
df=pd.DataFrame(Dic)
print (df)
df.insert(loc=1,column='grade',value=['a','b','a'])
print(df)
```

Ans. OUTPUT

	roll	name	marks
0	1	a	24
1	2	b	53
2	3	c	66

	roll	grade	name	marks
0	1	a	a	24
1	2	b	b	53
2	3	a	c	66

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11. Fill the missing statement to change the columns name in dataframe to get the given output.

```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
print(df)
_____________________________
print(df)
```

Ans.

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

	no	ename	sal
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Ans. df.columns=['no','ename','sal']

12. Give the output

```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
df1=df.rename(columns={'name':'ename'})
print(df)
print(df1)
```

Ans.

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

	empno	ename	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

13. Write small python code to change the dataframe column names using rename function
old column names=['empno','name','salary']
new column names=['ename','no','sal']

Ans.

```
df=df.rename(columns={'name':'ename','empno':'no','salary':'sal'})
```

OR

```
df.rename(columns={'name':'ename','empno':'no','salary':'sal'}, inplace=True)
```

OR

```
df.rename({'name': 'ename', 'empno': 'no','salary':'sal'}, axis=1, inplace=True)
```

OR

```
df.rename({'name': 'ename', 'empno': 'no','salary':'sal'}, axis=columns, inplace=True)
```

14. Write python code to rename column name 'productcode' to new name 'pcode' in product dataframe.

Ans. product.rename(columns={'productcode':'pcode'}, inplace=True)

15. Fill the missing values to delete the empno 103 using index()

```
import pandas as pd
```

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```
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=_______.DataFrame(_____,index=['A1','A2','A3','A4'])
df=df.drop(_______)
print(df)
```

OUTPUT

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A4	104	d	9000

Ans. df=pd.DataFrame(Dic,index=['A1','A2','A3','A4'])
df=df.drop(df.index[2])

16. Write command to add new row in dataframe df (id,name,price) with values(110,'xyz',800) using append method.

Ans. `df=df.append({'id':110,'name':'xyz','price':878},ignore_index=True)`

17. Consider the dataframe SHOP given below:

	Item	Qty	City	Price
101	Biscuit	100	Delhi	10
102	Jam	110	Kolkata	25
103	Coffee	200	Kolkata	55
104	Sauce	56	Mumbai	55
105	Chocolate	170	Delhi	25

Write commands to :

(i) Write short code to show the information having city="Delhi"
(ii) Calculate Qty* Price and assign to column 'Net_Price'
(iii) Display name of all rows
(iv) Display total no of rows
(v) Show the qty and price whose city is Kolkata
(vi) show item and city whose price greater than 50

Ans. (i) `print(SHOP[SHOP.City=='Delhi'])`

(ii) `SHOP['Net_Price']=SHOP.Qty*SHOP.Price`

(iii) `print(SHOP.axes[0])  #or print(SHOP.index)`

(iv) `print("no of rows",len(SHOP.axes[0]))`

(v) `print(SHOP [['Price','Qty']] [SHOP.City=='Kolkata'])`

(vi) `print(SHOP[['Item','City']][SHOP.Price>50])`

18. Consider a set of information for an Exam conducted for students with following details: **[comptt 2020]**

	Names	Marks	Trials	Passed
0	Sanya	95	2	yes
1	Krish	30	3	no
2	Rishav	96.5	1	yes
3	Deepak	75	2	no
4	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:

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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 datafram

(i) To display the 'Names' and 'Marks' columns from the DataFrame.
(ii) to change the 'Marks' in the 4th row (i.e. for index 3) to 91.5
(iii) to display the rows where number of 'Trials' in the examination is less than 2 and 'Marks' is greater than 95

Ans.
```
import pandas as pd
Data={'Names':['Sanya','Krish','Rishav','Deepak','Kriti',], 'Marks': [95, 70, 96.5, 75, 92],'Trials':
[2, 3, 1, 2, 1], 'Passed': ['yes', 'no', 'yes', 'no', 'yes']}
df = pd.DataFrame(Data )
total_rows=len(df.axes[0])
total_cols=len(df.axes[1])
print("Number of Rows: ", total_rows)
print("Number of Columns: ", total_cols)
```
(i) print(df[['Names', 'Marks']]) (ii) df.loc[3, 'Marks'] = 91.5
(iii) print(df[(df['Trials'] < 2) & (df['Marks'] > 95)])

19. For the above created Dataframe df write single line statements for each of the following parts (i) to (iv), which use Pandas method:

(i) To display the information of all failed student.
(ii) To change the passed information of Deepak to 'yes'
(iii) To show all information those marks>75 and Trials>1
(iv) To show name and marks of all students those marks>70 and Trials>1

Ans. (i) print(df[df.Passed=='no'])
(ii) df.loc[3, 'Passed'] = 'yes'
(iii) print(df[(df.Marks>75) & (df.Trials>1)])
(iv) print(df[['Names','Marks']][(df.Marks>75) & (df.Trials>1)])

20. Write the single line command to delete the column "marks" from datafram df using drop function.

Ans.
```
df=df.drop('marks',1)
```
OR
```
df=df.drop('marks',axis=1)
```
OR
```
df.drop('marks',1,inplace=True)
```

21. Write the correct output on execution of the following Pandas code:
```
import pandas as pd
df=pd.DataFrame([('Om',93),('Jay',91)],columns=['Name','Mark'])
print(df['Name'])
```

Ans. OUTPUT
0 Om
1 Jay

22. Write a program in Python Pandas to create the following DataFrame batsman from a Dictionary:

B_NO	Name	Score1	Score2
1	Sunil Pillai	90	80
2	Gaurav Sharma	65	45
3	Piyush Goel	70	90
4	Kartik Thakur	80	76

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Perform the following operations on the DataFrame :

(i) Add both the scores of a batsman and assign to column "Total"

(ii) Display the DataFrame **5[SP 21]**

Ans.
```
import pandas as pd
d1={'B_NO':[1,2,3,4],'Name':["Sunil Pillai","Gaurav Sharma","Piyush Goel","Kartik
Thakur"],'Score1':[90,65,70,80], 'Score2':[80,45,95,76]}
df=pd.DataFrame(d1)
print(df)
df['Total'] = df['Score1']+ df['Score2']  #or df['Total'] = sum(df['Score1'], df['Score2'])
print(df)
```

23. Consider the following DataFrame, classframe

	Rollno	Name	Class	Section	CGPA	Stream
St1	1	Aman	IX	E	8.7	Science
St2	2	Preeti	X	F	8.9	Arts
St3	3	Kartikey	IX	D	9.2	Science
St4	4	Lakshay	X	A	9.4	Commerce

Write commands to :

(i) Add a new column 'Activity' to the Dataframe

(ii) Add a new row with values (5, Mridula, X, F, 9.8, Science) **2[SP 21]**

Ans. (i) classframe['Activity']=['Swimming','Dancing','Cricket', 'Singing']

(ii) classframe.loc['St5']=[1,'Mridula', 'X', 'F', 9.8, 'Science']

24. Gagan created a DactaFrame df but forgot to give the index value ('A','B','C'). Create a small python code to rename the default index values with new index values.

Ans. df.rename(index={0:'A',1:'B',2:'C'},inplace=True)

25. Write the code in pandas to create the following dataframes :

df1

	mark1	mark2
0	10	15
1	40	45
2	15	30
3	40	70

df2

	mark1	mark2
0	30	20
1	20	25
2	20	30
3	50	30

Write the commands to do the following operations on the dataframes given above :

(i) To add dataframes df1 and df2.

(ii) To subtract df2 from df1

(iii) To rename column mark1 as marks1 in dataframe df1 .

(iv) To change index label of df1 from 0 to zero and from 1 to one **[SP 2019-20]**

Ans.
```
import numpy as np
import pandas as pd
df1 = pd.DataFrame({'mark1':[30,40,15,40],'mark2':[20,45,30,70]});   #values change
df2 = pd.DataFrame({'mark1':[10,20,20,50],'mark2':[15,25,30,30]});
print(df1)
print(df2)
```

(i) print(df1.add(df2))

(ii) print(df1.subtract(df2))

(iii) df1.rename(columns={'mark1':'marks1'}, inplace=True) # not changed df2
print(df1)

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(iv) df1.rename(index = {0: "zero", 1:"one"}, inplace = True)
print(df1)
OUTPUT:

	mark1	mark2
0	30	20
1	40	45
2	15	30
3	40	70

	mark1	mark2
0	10	15
1	20	25
2	20	30
3	50	30

	mark1	mark2
0	40	35
1	60	70
2	35	60
3	90	100

	mark1	mark2
0	20	5
1	20	20
2	-5	0
3	-10	40

	marks1	mark2
0	30	20
1	40	45
2	15	30
3	40	70

	marks1	mark2
zero	30	20
one	40	45
2	15	30
3	40	70

26. Consider the following DataFrame, Book

	Title	Price
101	ABC of Physics	300
102	Informatics made fun	250
103	Computers are simple	375

Write commands to :

(i) Add a new column 'Year' with the followng values : (2005,2010,2018)

(ii) Add a new row with values ("Informatics",350,2020)

Ans. (i) Book['Year']=[2005,2010,2018]

(ii) Book.loc[104]=['Informatics',350,2020]

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27. Consider the following DataFrame, Friends

	Name	Hobbies
F101	Bijoy	Swimming
F102	Abhinav	Reading books
F103	Jyotsna	Dancing

Write commands to :

(i) Add a new column 'Age' at 2 position using insert function with the followng values (20,17,18)

(ii) Change the column name "Name" to "FName"

Ans. (i) Friends.insert(2'age',[20,17,18])

(ii) Friends.rename(columns={'Name': 'Fname'},inplace=True)

28. Consider the following DataFrame, Teacher

	Department	Periods
T101	SCIENCE	32
T102	ENGLISH	30
T103	MATHEMATICS	34

(i) Add a new row with values ("COMPUTER",35)

(ii) Delete the column "Department'

Ans. (i) Teacher.loc['T104']=['COMPUTER',35]

(ii) Teacher=Teacher.drop('Department',1) #or Teacher.drop('Department',axis=1,inplace=True)

29. Consider the following DataFrame, Employee

	NAME	Commission
101	Sabhyata Sharma	9000
102	Divya Arora	8900
103	Faizal Zaidi	15000

(i) Display the records of employees having index value 101 and 103 using loc

(ii) Write code to delete the row whose index value is 102

Ans. (i) print(Employee.loc[[101,103]])

(ii) Employee=Employee.drop(102)

30. Consider the following DataFrame, ITEM

ITEM_NO	COST
101	5000
102	3000
103	4000

(i) Add new row with ITEM_NO=104 and cost=8000 using append method

(ii) Display the cost of ITEM_NO 103

Ans. (i) ITEM=ITEM.append({'ITEM_NO':104,'cost':8000},ignore_index=True)

(ii) print(ITEM.iloc[2,1])

31. Write a program in Python Pandas to create the following DataFrame salesman from a Dictionary:

SID	Name	Salary	Bonus
S101	Amit	67000	5000
S102	Deepika	32000	7000
S103	Vinay	35000	9000

Perform the following operations on the DataFrame :

(i) Add both the salary and bonus of a salesman and assign to column "Total Salary"

(ii) Display the highest salary and lowest bonus of the DataFrame.

(iii) Display the DataFrame

Ans.
```
import pandas as pd
```

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```
dic={'SID':('S101','S102','S103'),'Name':('Amit','Deepika','Vinay'),'Salary':(67000,32000,35000),
'Bonus':(5000,7000,9000)}
salesman=pd.DataFrame(dic)
```
(i) `salesman['Total  Salary']=salesman['Bonus']+salesman['Salary']`

(ii) `print(max(salesman['Salary']),min(salesman['Bonus']))`

OR

`print(salesman['Salary'].max(),salesman['Bonus'].min())`

(iii) `print(salesman)`

32. Write a program in Python Pandas to create the following DataFrame Furniture from a Dictionary:

FCODE	NAME	PRICE
10023	Table	4000
10001	Chair	2050
10012	Sofa	3500

Perform the following operations on the DataFrame :

(i) Calulate 10% of price and assign to column "Tax"

(ii) Count the no of names of DataFrame.

(iii) Display the DataFrame

Ans.
```
import pandas as pd
dic={'FCODE':(10023,10001,10012),'Name':('Table','Chair','Sofa'),'Price':(4000,2050,3500)}
furniture=pd.DataFrame(dic)
```
(i) `furniture['Tax']=furniture['Price']*10/100`

(ii) `print(furniture['NAME'].count())`

(iii) `print(furniture)`

33. Write a program in Python Pandas to create the following DataFrame Order from a Dictionary:

OrderId	SalesPerson	Sales
101	Ravi	40000
102	Rashmi	50000
103	Rohan	55000

Perform the following operations on the DataFrame :

(i) To change the 'Sales' in the 3rd row (i.e. for index 2) to 25000

(ii) Change the column name 'OrderId' to 'Id'

(iii) Display the DataFrame columns names

Ans.
```
import pandas as pd
dic={'OrderId':(101,102,103),'SalesPerson':('Ravi','Rashmi','Rohan'),'Sales':(40000,50000,55000)}
order=pd.DataFrame(dic)
```
(i) order.loc[2,'Sales']=25000

(ii) order.rename(columns={'OrderId':'Id'},inplace=True)

(iii) print(order.columns)

34. 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):

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

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(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 highest QUANTITY of all ITEMS in the STOCK
(iv) To change the 'ID' 1007 to 1005 in the 3rd row (i.e. for index 2)
(v) To display the rows where 'ID' in the stock is less than 1005 and 'Quantity' is greater than 400

Ans. (i) print(Stock["ID"].count())
(ii) print(Stock["QUANTITY"].sum())
(iii) print(Stock["QUANTITY"].max())
(iv) Stock.loc[2,'ID']=1005
(v) print(Stock[(Stock['ID'] < 1005) and (Stock['QUANTITY'] > 400)])

35. Write a program in Python Pandas to create the following DataFrame batsman from a Dictionary:

B_NO	Name	Score1	Score2
1	Sunil Pillai	90	80
2	Gaurav Sharma	65	45
3	Piyush Goel	70	90
4	Kartik Thakur	80	76

Perform the following operations on the DataFrame :
(i) Add both the scores of a batsman and assign to column "Total"
(ii) Display the highest score in both Score1 and Score2 of the DataFrame.
(iii) Display the DataFrame **5[SP 21]**

Ans.
```
import pandas as pd
d1={'B_NO':[1,2,3,4],'Name':["Sunil Pillai","Gaurav Sharma","Piyush Goel","Kartik
Thakur"],'Score1':[90,65,70,80], 'Score2':[80,45,95,76]}
df=pd.DataFrame(d1)
print(df)
df['Total'] = df['Score1']+ df['Score2']  #or df['Total'] = sum(df['Score1'],
df['Score2'])
print(df)
print("Maximum scores are :" , max(df['Score1']), max(df['Score2']))
```

36. Sangeeta has created a dataframe with columns- name and marks but wants to display only name column. She has written the code but getting some errors, help sangeeta and recifty the errors.
```
import pandas as pd #statement 1
lst=[['Nidhi',95],['Gurjeet',97],['Pahul',88],['Divya',72]] #statement 2
df=pd.DataFrame(lst,columns=['name','marks']) #statement 3
print (name) #statement 4
```
Ans. error in statement 4
print (df['name'])

37. Give the output
```
import pandas as pd
df = pd.DataFrame({'x': [1, 2, 3], 'y': [4, 5, 6]})
df.rename(columns={'x': 'A'},inplace=True)
print(df)
```
Ans. OUTPUT

	A	y
0	1	4
1	2	5
2	3	6

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38. In a DataFrame, Axis= 1 represents the_____ elements.
(i) row (ii) column (iii) True (iv) False

Ans. (b)

39. A dataframe df is given below:

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Give the output of the following :

(a) print(df.loc['A2':'A3',['name','salary']])

Ans.

	name	salary
A2	b	5000
A3	c	8000

(b) print(df.iloc[0:2])

Ans.

	empno	name	salary
A1	101	a	3000
A2	102	b	5000

(c) print(df.iloc[1:3,2:3])

Ans.

	salary
A2	5000
A3	8000

CSV FILES

CSV (Comma-separated values) is a standard for storing tabular data in text format, where commas are used to separate the different columns, and newlines (carriage return/press enter) used to separate rows. Typically, the first row in a CSV file contains the names of the columns for the data.

Save csv to working directory

64. Write python code to write dataframe data into "a.csv" file.

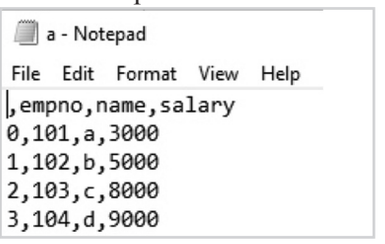
Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic)
df.to_csv("a.csv")
```

csv can be opened in excel, notepad, etc.

In excel

	A	B	C	D
1		empno	name	salary
2	0	101	a	3000
3	1	102	b	5000
4	2	103	c	8000
5	3	104	d	9000

In notepad



Save csv to any other directory.

The r character should be placed before the path name.

65. Modify the above code and write the data in d;\software folder.

Ans.
```
import pandas as pd
Dic={'empno':(101,102,103,104),'name':('a','b','c','d'),'salary':(3000,5000,8000,9000)}
df=pd.DataFrame(Dic)
df.to_csv(r"D:\software\a.csv")     # or df.to_csv("D:\\software\\a.csv")
```

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How to Create CSV File in Excel

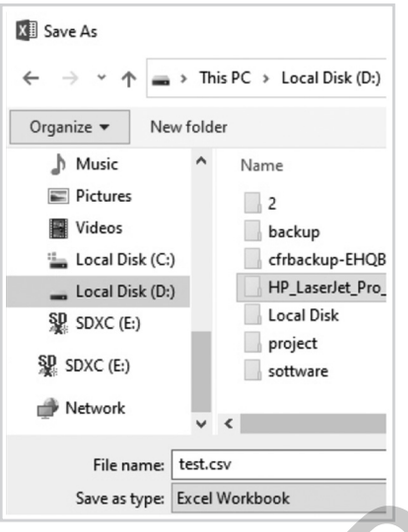
Step 1: Open excel and write data in worksheet

Step 2: Select file option from menu and click on save as ...

Step 3: Select drive and folder name where you want to save csv file.



	A	B	C	D
1	roll	name	marks	
2	1	aleeza	55	
3	2	ananya	34	
4	3	rajesh	90	
5	4	amar	23	
6	5	rohit	42	
7	6	pahul	53	
8	7	jyoti	24	
9	8	divya	99	
10	9	harshit	24	
11	10	himanshi	66	





Step 4: Click on save as type option and select csv option from list.

Step 5: Click on save button.

Read CSV File as Pandas

Using the read_csv() function from the pandas package, you can import tabular data from CSV files into pandas dataframe.

66. Write python code to read a csv file "test.csv" from D:\

Ans.
```
import pandas as pd
df = pd.read_csv('d:\\test.csv') #read the csv file
print(df)
```

	roll	name	marks
0	1	aleeza	55
1	2	ananya	34
2	3	rajesh	90
3	4	amar	23
4	5	rohit	42
5	6	pahul	53
6	7	jyoti	24
7	8	divya	99
8	9	harshit	24
9	10	himanshi	66

67. Write command to display the records of students those marks greater than 50 from the above created df.

Ans.
```
print(df[df['marks']>50])
```

	roll	name	marks
0	1	aleeza	55
2	3	rajesh	90
5	6	pahul	53
7	8	divya	99
9	10	himanshi	66

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Print Specified Columns

68. Read name and roll from test.csv

Ans.
```
import pandas
df = pandas.read_csv('d:\\test.csv', usecols =['roll','name'])
print(df)
```

	roll	name
0	1	aleeka
1	2	aleeza
2	3	alina
3	4	ananya
4	5	ananya
5	6	arni
6	7	bhavna
7	8	divya
8	9	harshita
9	10	himanshi

MULTIPLE CHOICE QUESTIONS

1. Given a Pandas dataframe called "S", the command which will display the last 5 rows is
(a) print(S.tail()) (b) print(S.Tail(5))
(c) print(S.tails(5)) (d) print(S.Tails(5))

2. Write a single line command to calculate 10% from 'sale' column from dataframe df and assign to new column 'Commission'
(a) df.insert['Commission']=df.sale*10/100 (b) df['Commission']=df.sale*10/100
(c) df.loc['Commission']=df.sale*10/100 (d) df['Commission',axis=1]=df.sale*10/100

3. Write the single line command to delete the column "marks" from dataframe df using drop function.
(a) df=df.drop(col='marks') (b) df=df.drop('marks',axis=col)
(c) df=df.drop('marks',axis=0) (d) df=df.drop('marks',axis=1)

4. Which one is incorrect option to add a new column using insert() in the last place(3rd place) named "Salary" from the list Sal=[10000,15000,20000] in an existing dataframe named EMP already having 2 columns
(a) EMP.insert(loc=2,column="Salary",value=Sal)
(b) EMP.insert(2,"Salary",Sal)
(c) EMP.insert(loc=2,column="Salary",value=[10000,15000,20000])
(d) EMP.insert(loc=2,col="Salary",value=Sal)

5. Write a small python code to drop a column "address" from dataframe stud using del.
(a) del stud[col="address"] (b) del stud[column="address"]
(c) del stud["address",axis=1] (d) del stud["address"]

6. In a DataFrame, Axis= 1 represents the_____ elements.
(a) Row (b) Column (c) True (d) False

7. Write commands to Add a new column 'Year' with the following values(2005,2010,2018) in data frame BOOK.
(a) Book['Year']=[2005,2010,2018]
(b) Book[col='Year']=[2005,2010,2018]
(c) Book['Year',axis=1]=[2005,2010,2018]
(d) Book['Year'] values [2005,2010,2018]

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8. Add new row with ITEM_NO=104 and cost=8000 using append method in dataframe ITEM.
(a) ITEM=ITEM.append({'ITEM_NO':104,'cost':8000})
(b) TEM=ITEM.append({'ITEM_NO'=104,'cost'=8000},ignore_index=True)
(c) ITEM.append({'ITEM_NO':104,'cost':8000},ignore_index=True)
(d) ITEM=ITEM.append({'ITEM_NO':104,'cost':8000},ignore_index=True)

9. Write code to delete the row whose index value is A1 from dataframe df.
(a) df=df.drop('A1') (b) df=df.drop(index='A1')
(c) df=df.drop('A1,axis=index') (d) df=df.del('A1')

10. Write code to delete rows those getting 5000 salary.
(a) df=df.drop[salary==5000] (b) df=df[df.salary!=5000]
(c) df.drop[df.salary==5000,axis=0] (d) df=df.drop[salary!=5000]

11. Write the command to display Pid,Price from an existing dataframe named PRODUCT having 4 columns =[Pid, Pname,Price,Qty].
(a) print (PRODUCT[['Pid','Price']]) (b) print (PRODUCT[col=['Pid','Price']])
(c) print (PRODUCT['Pid','Price']) (d) print (PRODUCT['Pid','Price'],axis=1)

12. Which option is incorrect to change the dataframe column names using rename function old column names=['empno','name','salary']new column names=['ename','no','sal']?
(a) df=df.rename(columns={'name':'ename','empno':'no','salary':'sal'})
(b) df.rename(columns={'name':'ename','empno':'no','salary':'sal'}, inplace=True)
(c) df.rename({'name': 'ename', 'empno': 'no','salary':'sal'}, axis=1, inplace=True)
(d) df.rename({'name': 'ename', 'empno': 'no','salary':'sal'}, inplace=True)

13. Write short code to show the information having city="Delhi" from dataframe SHOP.
(a) print(SHOP[City=='Delhi']) (b) print(SHOP[SHOP.City=='Delhi'])
(c) print(SHOP[SHOP.'City'=='Delhi']) (d) print(SHOP[SHOP[City]=='Delhi'])

14. Write the short command to calculate Qty*price from dataframe SHOP and assign to new column 'Net_Price'.
(a) SHOP['Net_Price']=Qty*Price
(b) SHOP['Net_Price']=SHOP[Qty*Price]
(c) SHOP['Net_Price']=SHOP.Qty*SHOP.Price
(d) SHOP['Net_Price'=Qty*Price]

15. Which of the following command is used to create the dataframe df using list lst with heading 'colors'.
(a) df=pd.DataFrame(lst,heading=['colors']) (b) df=pd.DataFrame(lst,columns=['colors'])
(c) df=pd.DataFrame(lst,column=['colors']) (d) df=pd.DataFrame(lst,colnames=['colors'])

16. From a series P, print[P[-3:]) will display
(a) last 3 records (b) last 2 records
(c) 1st 3 records (d) 3rd record from back

17. Write command to print name of columns of dataframe df.
(a) print(df.colnames) (b) print(df.cols) (c) print(df.columns) (d) print(df.axes[0])

18. Write the correct option from (a) to (d) for the method used in Pandas to delete column(s) in a dataframe.
(a) delete() (b) drop() (c) remove() (d) pop()

19. Write the correct option from (a) to (d) for the method used in Pandas to change the name of column in a dataframe.
(a) newname() (b) changename() (c) colname() (d) rename()

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20. Consider the following DataFrame df and answer any four questions from (i) to (iv).

	Roll	Name	marks
0	1	a	87
1	2	b	45
2	3	c	67
3	4	d	39
4	5	e	78

(i) Which of the following command is used to display all records having rollno>3?

(a) print(df[df['Roll']>3])
(b) print(df['Roll']>3)
(c) print(df.Roll>3])
(d) print(df('Roll')>3)

(ii) Which of the following command is used to add a new column 'Grade' with the values: ' A', 'B', 'A', 'B', 'A' to the DataFrame?

(a) df.column=['A','B','A','B','A']
(b) df ['Grade']=['A','B','A','B','A']
(c) df.insert(loc=3,column='Grade',value= ['A','B','A','B','A'])
(d) both (b) and (c) are correct

(iii) Which of the following command is used to delete the column "Name"?

(a) del df["Name"]
(b) df=df.drop('name',axis=1)
(c) df=df.drop('name',axis=0)
(d) both (a) and (b) are correct

(iv) Which of the following command is used to rename the column "Marks" to "Tmarks" in the existing dataframe df?

(a) df.rename(columns={'Marks': 'TMarks'},inplace=True)
(b) df.rename(columns={'Marks': 'TMarks'})
(c) df.rename({"Marks":"TMarks"},axis=0)
(d) both (a) and (c) are correct

21. Consider the following DataFrame Faculty and answer any four questions from (i)-(v)

	FNAME	AGE	DEPARTMENT	GRADE
0	Moksha	30	Biology	A
1	Malini	35	Maths	A
2	Akshit	43	English	B
3	Nishant	27	Maths	B

(i) Which of the following command(s) will display the information whose grade is "A"

(a) print(Faculty[Faculty.Grade= ="A"])
(b) print(Faculty[Faculty['Grade']= ='A'])
(c) print(Faculty['Grade']= ='A')
(d) both (a) and (b)

(ii) Which of the following command(s) is used to add new row at the end of dataframe with values('Ankur',30,'Computer','A')

(A) Faculty.insert('Ankur',30,'Computer','A')
(B) Faculty.loc[4]=['Ankur',30,'Computer','A']
(C) Faculty.row('Ankur',30,'Computer','A')
(D) Faculty=Faculty.append({'Fname':Ankur,'Age':30,'Department':'Computer','Grade':'A'},ignore_index=True)

(a) A only (b) A and C (c) A and D (d) B and D

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(iii) Select the correct option to delete the row whose index value is 1.

(A) Faculty=Faculty.drop(df.index[1]) (B) Faculty=Faculty.drop(1)
(C) Faculty=Faculty.drop(1,axis=0) (D) Faculty= Faculty.drop(1,0)
(a) only A is correct (b) A and B are correct (c) A, B and C are correct (d) all are correct

(iv) Which of the following command is used to display the grade of Fname Akshit?

(a) print(Faculty.loc[2,3]) (b) print(Fauclty.iloc[2,3])
(c) print(Fauclty.iloc[2,4]) (d) print(Fauclty.iloc[3,4])

(v) Choose the correct option to change the name of index 0 to new name 'x'.

(a) Faculty.indexname({0:'x'},inplace=True) (b) Faculty.rowname({0:'x'},inplace=True)
(c) Faculty.newname({0:'x'},inplace=True) (d) Faculty.rename({0:'x'},inplace=True)

22. Consider the following DataFrame stud and answer any four questions from (i) to (v).

	roll	name	marks
S1	1	Nidhi	87
S2	2	Jyoti	45
S3	3	Poonam	67
S4	4	Karambir	39
S5	5	Sangeeta	78

(i) Which of the following code will display the total number of rows?

(a) print(len(stud.axes[0]) (b) print(stud.len(0))
(c) print(stud.len[axes=0]) (d) print(len(stud.axes[row])

(ii) State the command that will give the output as :

	roll	name
S2	2	Jyoti
S3	3	Poonam

(a) print(stud.iloc[1:2,1:2]) (b) print(stud.iloc[2:3,0:2])
(c) print(stud.iloc[1:3,0:2]) (d) print(stud.iloc[1:3,1:2])

(iii) Which of the following is used to add new row with following data? 6, Divya',92

(A) stud['S6']=[6,'Divya',92] (B) stud.iloc['S6']=[6,'Divya',92]
(C) stud..row['S6']=[6,'Divya',92] (D) stud.loc['S6']=[6,'Divya',92]
(a) print(stud.iloc[1:2,1:2]) (b) print(stud.iloc[2:3,0:2])
(a) A (b) C (c) D (d) D

(iv) Choose the correct option to add new column Gender at position 2 (index value 1) to dataframe stud with values ['F','F','F','M','F']

(A) stud.insert(1,'Gender',['F','F','F','M','F'])
(B) stud.insert(loc=1,column='Gender',value=['F','F','F','M','F'])
(C) stud.insert(loc=1,field='Gender',values=['F','F','F','M','F'])
(D) stud.insert(loc=1,column='Gender',values=['F','F','F','M','F'])
(a) only A is correct (b) A and B are correct
(c) B and C are corect (d) A and D are correct

(v) Which command is used to display all index values?

(a) print(stud.index) (b) print(stud.value(axis=0))
(c) print(stud.indexs) (d) print(stud.index.values())

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23. Mr. Ankit is working in an organisation as data analyst. He uses Python Pandas and Matplotlib for the same. He got a dataset of the passengers for the year 2010 to 2012 for January, March and December. His manager wants certain information from him, but he is facing some problems. Help him by answering few questions given below: **[CBSE QB 2021]**

	year	month	passengers
0	2010	Jan	25
1	2010	Mar	50
2	2012	Jan	35
3	2010	Dec	55
4	2012	Dec	65

Code to create the above data frame:

```
import pandas as _____________ #Statement 1
data={"Year":[2010,2010,2012,2010,2012],"Month":["Jan","Mar","Jan","Dec","Dec"]
,"Passengers":[25,50,35,55,65]}
df=pd._____________________(data) #Statement 2
print(df)
```

(i) Choose the right code from the following for statement 1.
(a) pd (b) df (c) data (d) p

(ii) Choose the right code from the following for the statement 2.
(a) Dataframe (b) DataFrame (c) Series (d) Dictionary

(iii) Choose the correct statement/method for the required output: (5,3)
(a) df.index (b) df.shape() (c) df.shape (d) df.size

(iv) He wants to print the details of "January" month along with the number of passengers. Identify the correct statement:

	month	passengers
0	Jan	25
2	Jan	35

(a) df.loc[['Month','Passengers']][df['Month']=='Jan']
(b) df[['Month','Passengers']][df['Month']=='Jan']
(c) df.iloc[['Month','Passengers']][df['Month']=='Jan']
(d) df(['Month','Passengers']][df['Month']=='Jan')

(v) Mr. Ankit wants to change the index of the Data Frame and the output for the same is given below. Identify the correct statement to change the index.

	year	month	passengers
AirIndia	2010	Jan	25
Indigo	2010	Mar	50
Spicejet	2012	Jan	35
Jet	2010	Dec	55
Emirates	2012	Dec	65

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(a) df.index[]=["Air India","Indigo","Spicejet","Jet","Emirates"]
(b) df.index["Air India","Indigo","Spicejet","Jet","Emirates"]
(c) df.index=["Air India","Indigo","Spicejet", "Jet","Emirates"]
(d) df.index()=["Air India","Indigo","Spicejet","Jet","Emirates"]

24. Sanyukta is the event incharge in a school. One of her students gave her a suggestion to use Python Pandas and Matplotlib for analysing and visualising the data, respectively. She has created a Data frame "SportsDay" to keep track of the number of First, Second and Third prizes won by different houses in various events. **[CBSE QB]**

	House	First	Second	Third
0	Chenab	5	7	6
1	Ganges	10	5	4
2	Jamuna	8	13	15
3	Jhelum	12	9	12
4	Ravi	5	11	10
5	Setluj	10	5	3

Write Python commands to do the following:

(i) Display the house names where the number of Second Prizes are in the range of 12 to 20.
(a) df['Name'][(df['Second']>=12) and (df['Second']<=20)]
(b) df[Name][(df['Second']>=12) & (df['Second']<=20)]
(c) df['Name'][(df['Second']>=12) & (df['Second']<=20)]
(d) df[(df['Second']>=12) & (df['Second']<=20)]

(ii) Display all the records in the reverse order.
(a) print(df[::1])
(b) print(df.iloc[::-1])
(c) print(df[-1:]+df[:-1])
(d) print(df.reverse())

(iii) Display the bottom 3 records.
(a) df.last(3)
(b) df.bottom(3)
(c) df.next(3)
(d) df.tail(3)

(iv) Choose the correct output for the given statements:

```
x=df.columns[:1]
print(x)
```

(a) 0
(b) Name
(c) First
(d) House

(v) Which command will give the output 24?
(a) print(df.size)
(b) print(df.shape)
(c) print(df.index)
(d) print(df.axes)

25. Zeenat has created the following data frame dataframe1 to keep track of data Rollno, Name, Marks1 and Marks2 for various students of her class where row indexes are taken as the default values: **[CBSE QB]**

Rollno	Name	Marks1	Marks2
1	Swapnil Sharma	30	50
2	Raj Batra	75	45
3	Bhoomi Singh	82	95
4	Jay Gupta	90	95

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(i) She needs to know the marks scored by Rollno 2. Help her to identify the correct set of statement/s from the given options:

(a) print(dataframe1[dataframe1[‘Rollno’]= =2])
(b) print(dataframe1[‘Rollno’]= =2)
(c) print(dataframe1[dataframe1. Rollno = =2])
(d) both (a) and (c)

(ii) Which of the following statement/s will delete the 3rd column?

(A) del dataframe1[‘Marks1’]
(B) dataframe1.pop(‘Marks1’)
(C) drop dataframe1[‘Marks1’]
(D) pop dataframe1[‘Marks1’]

Choose the correct option:

(a) both (A) and (B)
(b) only (B)
(c) (A), (B) and (C)
(d) (A), (B) and (D)

(iii) Which of the following command will display the total number of elements in the dataframe?

(a) print(dataframe1.shape)
(b) print(dataframe1.num)
(c) print(dataframe1.size)
(d) print(dataframe1.elements)

(iv) Now she wants to add a new column Marks3 with relevant data. Help her choose the command to perform this task.

(a) dataframe1.column=[45,52,90,95]
(b) dataframe1 [‘Marks3’]= [45,52,90,95]
(c) dataframe1.loc[‘Marks3’]= [45,52,90,95]
(d) Both (b) and (c) are correct

26. Naman has created following dataframe: “Climate” to record the data about climatic conditions of four years. **[CBSE QB]**

Year	MaxTemp	MinTemp	Rainfall
2017	32	20	123
2018	33	22	140
2019	35	21	135
2020	34	23	160

(i) Which of the following code snippets will return the MaxTemp and Rainfall for year 2018 and 2019?

(a) Climate[[‘MaxTemp’,’Rainfall’]][1:3]
(b) Climate[‘MaxTemp’, ‘Rainfall’][1:3]
(c) Climate.iloc[1:3, [0,2]]
(d) Climate.iloc[1:3,1:2]

(ii) Display the temperature difference between MaxTemp and MinTemp for all the rows in the dataframe Climate.

(a) Climate=Climate[“MaxTemp”]-Climate[“MinTemp”]
(b) print(Climate[“maxt”]-Climate[“mint”])
(c) print(Climate[“MaxTemp”]-Climate[“MinTemp”])
(d) print(Climate.Climate[“MaxTemp”]-Climate[“MinTemp”])

(iii) To display 2 rows from the top in the dataframe, which of the following statement is correct?

(a) print (Climate.head()=2)
(b) print (Climate.head(n==2))
(c) print (Climate.head(range(2)))
(d) print (Climate.head(2))

(iv) Which of the following statement/s will give the exact number of values in each column of the dataframe?

(A) print(Climate.count())
(B) print(Climate.count(0))
(C) print(Climate.count)
(D) print(Climate.count(axis=’index’))

Choose the correct option:

(a) print(dataframe1.shape)
(b) print(dataframe1.num)
(a) both (A) and (B)
(b) only (B)
(c) (A), (B) and (C)
(d) (A), (B) and (D)

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(v) To display 2 rows from the bottom in the dataframe, which of the following statement is correct?

(a) print (Climate.tail()=2)
(b) print (Climate.tail(n==2))
(c) print(Climate.tail(range(2)))
(d) print (Climate.tail(2))

27. HR Department of ABCTech has created following dataframe to store data about salaries and bonus paid to their employees: **[CBSE QB]**

```
import pandas as pd
import numpy as np
d1={'EName':[ 'Kavita', 'Sudha',
'Garima']'],'Sal':[50000,60000,55000],'Bonus':[3000,4000,5000]}
Df1=pd.DataFrame(d1)
```

Choose the python statement using suitable functions for the following tasks:

(i) Display the columns Sal and Bonus.

(a) df1 ['Sal :Bonus]
(b) df1.loc(['Sal','Bonus'])
(c) df1.iloc(['Sal','Bonus'])
(d) df1[['Sal','Bonus']]

(ii) Display the details of employee Kavita.

(a) df1[df1.EName=='Kavita']
(b) df1.loc[df1.EName=='Kavita']
(c) df1.iloc[df1.EName=='Kavita']
(d) df1[EName='Kavita']

(iii) Display the details of the last employee.

(a) Df1.tail(1) (b) Df1.tail (-1) (c) Df1.head(n=1) (d) Df1.head()

(iv) Add a new column named 'Email' with the value "abc@gmail.com".

(a) Df1['Email']= 'abc@gmail.com'
(b) Df1[Email]='abc@gmail.com'
(c) Df1.loc['Email']='abc@gmail.com'
(d) Df1('Email')='abc@gmail.com'

(v) Write a python statement to print the details of employees having Sal more than 50000.

(a) df1.Sal>=5000
(b) df1[df1.Sal>=5000]
(c) df1[df1.'Sal'>=5000]
(d) df1.iloc[df1.Sal>=5000]

ANSWERS

1. (a)	**2.** (b)	**3.** (d)	**4.** (d)	**5.** (d)	**6.** (b)	**7.** (a)	**8.** (d)	**9.** (a)	**10.** (b)
11. (a)	**12.** (d)	**13.** (b)	**14.** (c)	**15.** (b)	**16.** (a)	**17.** (c)	**18.** (b)	**19.** (d)	

20. **(i)** (a)	**(ii)** (d)	**(iii)** (d)	**(iv)** (a)	
21. **(i)** (d)	**(ii)** (d)	**(iii)** (d)	**(iv)** (b)	**(v)** (d)
22. **(i)** (a)	**(ii)** (c)	**(iii)** (d)	**(iv)** (b)	**(v)** (a)
23. **(i)** (a)	**(ii)** (a)	**(iii)** (c)	**(iv)** (b)	**(v)** (c)
24. **(i)** (c)	**(ii)** (b)	**(iii)** (d)	**(iv)** (d)	**(v)** (a)
25. **(i)** (d)	**(ii)** (a)	**(iii)** (c)	**(iv)** (b)	
26. **(i)** (c)	**(ii)** (c)	**(iii)** (d)	**(iv)** (d)	**(v)** (d)
27. **(i)** (d)	**(ii)** (a)	**(iii)** (a)	**(iv)** (a)	**(v)** (b)

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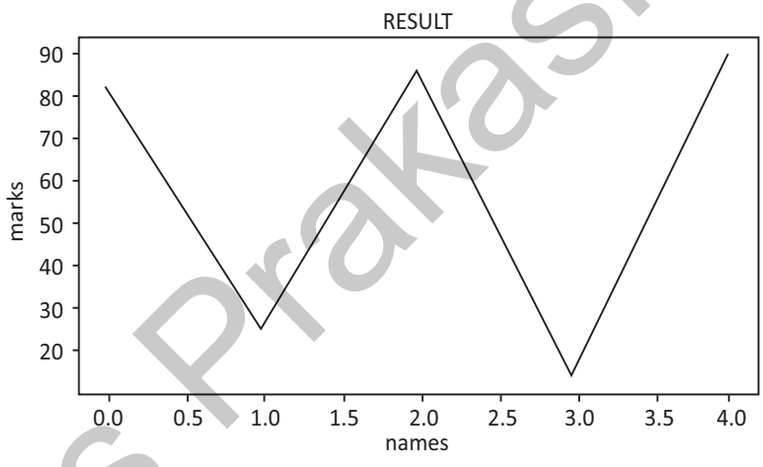
3 Visualization

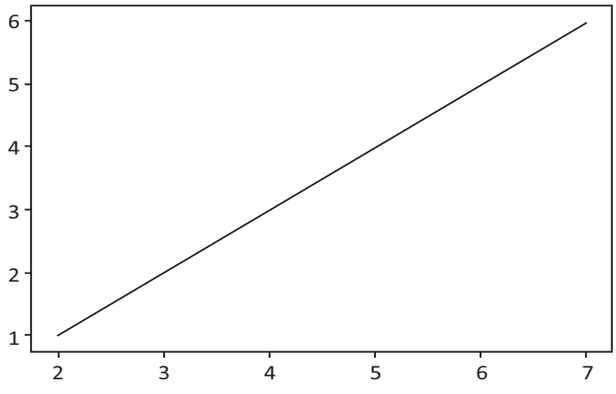
LINE GRAPH

1. Draw a Line Graph from the following program
```
import matplotlib.pyplot as p1
a=[82,25,87,14,90]
p1.ylabel("marks")
p1.plot(a)
p1.show()
```



Ans. You may be wondering why the x-axis ranges from 0-4 If you provide a single list or array to the plot() command, matplotlib assumes it is a sequence of y values, and automatically generates the x values for you. Since python ranges start with 0, the default x vector has the same length as y but starts with 0. Hence the x data are [0,1,2,3,4].

2. Consider the following graph. Write the code to plot it. **3[SP 21]**



Ans.
```
import matplotlib.pyplot as plt
a = [1,2,3,4,5,6]
b = [2,3,4,5,6,7]
plt.plot (a,b)
plt.show()
```

Legend

A legend is an area describing the elements of the graph. In the matplotlib library, there's a function called legend() which is used to Place a legend on the axes.

Legend loc

Location String	'best' (By default)	'upper right'	'upper left'	'lower left'	'lower right'	'right'	'center left'	'center right'	'lower center'	'upper center'	'center'
Location Code	0	1	2	3	4	5	6	7	8	9	10

The string 'best' places the legend at the location, among the locations defined so far, with the minimum overlap with other drawn artists.

The elements to be added to the legend are automatically determined, when you do not pass any extra arguments.In this case, the labels are taken from the artist.

3. Give the output from the given python code

Ans.
```
import numpy as np
import matplotlib.pyplot as p1
```

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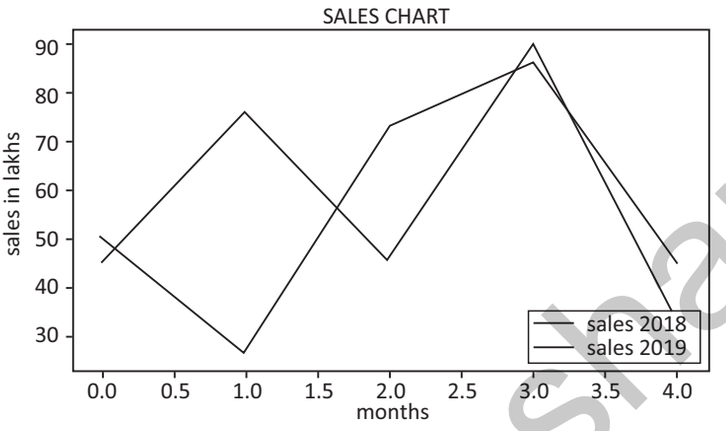
```
x=np.arange(5)          #or  x=[0,1,2,3,4]
y2018=[45,76,45,90,34]
y2019=[50,26,73,86,45]
p1.ylabel("sales in lakhs")
p1.xlabel("months")
p1.title("SALES CHART")
p1.plot(x,y2018)
p1.plot(x,y2019)
p1.legend(['sales 2018','sales 2019'],loc=4)
p1.show()
```

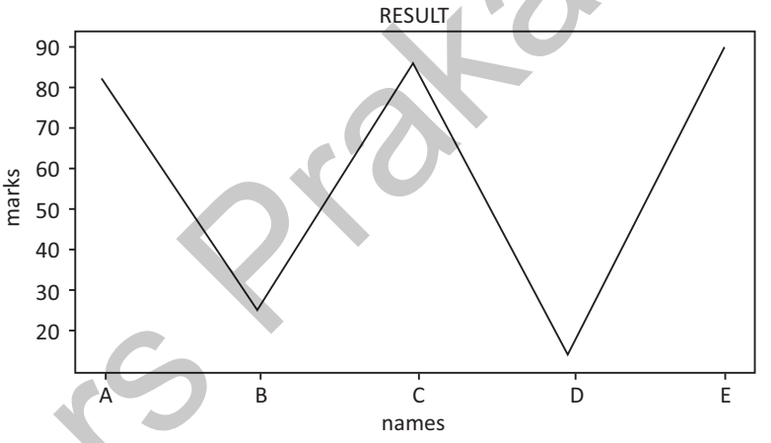


4. Write python code to create a Line Graph using list of elements x and y. Set ylabel as "marks" and xlabel as "names" . Title of graph is "Result"

x=['A','B','C','D','E']

y=[82,25,87,14,90]

Ans.
```
import matplotlib.pyplot as p1
x=['A','B','C','D','E']
y=[82,25,87,14,90]
p1.ylabel("marks")
p1.xlabel("names")
p1.title("RESULT")
p1.plot(x,y)
p1.show()
```



Save the figure using savefig()

savefig() method is used to save the figure created after plotting data. The figure created can be saved to our local machines by using this method. For example :

plt.savefig('result.png')

The .savefig() method requires a filename be specified as the first argument. This filename can be a full path and as seen above, can also include a particular file extension.

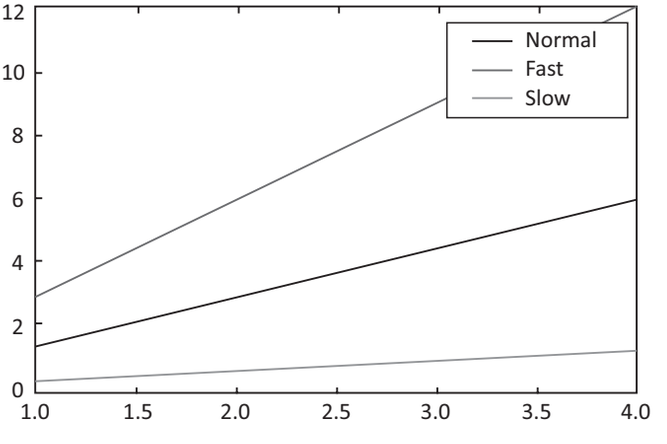
5. Mr. Harry wants to draw a line chart using a list of elements named LIST. Complete the code to perform the following operations: **[SP 2019-20]**

```
(i) To plot a line chart using the given LIST, (ii) To give a y-axis label to
the line chart named "Sample Numbers".
import matplotlib.pyplot as PLINE
LIST=[10,20,30,40,50,60]
_____________________ Statement 1
_____________________ Statement 2
PLINE.show()
```

Ans. (i) PLINE.plot(LIST)

(ii) PLINE.ylabel("Sample Numbers")

6. Write a code to plot the speed of passenger train shown in the figure given alongside: **[SP 2019-20]**



Ans.
```
import matplotlib.pyplot as plt
import numpy as np
x = np.arange(1, 5)       #or x=[1,2,3,4]
plt.plot(x, x*1.5, label='Normal')
plt.plot(x, x*3.0, label='Fast')
```

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```
plt.plot(x, x/3.0, label='Slow')
plt.legend()
plt.show()
```

7. (a) 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.

	Marks	
Test	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()
```

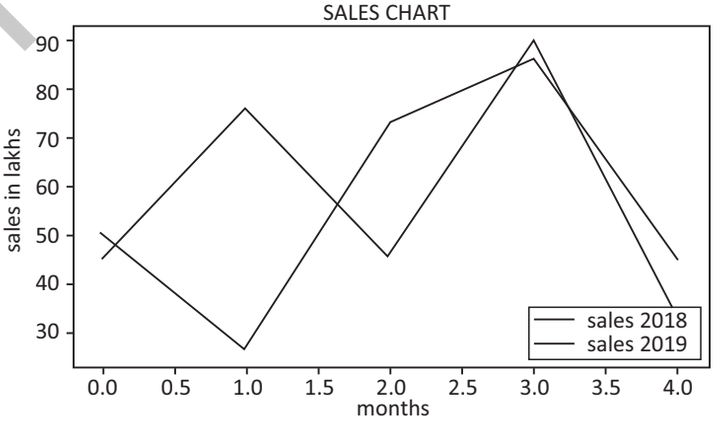
[comptt 2020]

Ans. (a) ['Unit1','Unit2','Unit3','Unit4']
[85,88,89,87]
[97,99,90,92]
plt.ylabel('Marks')
plt.legend(['Rohit','Suman'])

(b) Give the output

```
import numpy as np
import matplotlib.pyplot as p1
x=np.arange(5) # or x=[1,2,3,4]
y2018=[45,76,45,90,34]
y2019=[50,26,73,86,45]
p1.ylabel("sales in lakhs")
p1.xlabel("months")
p1.title("SALES CHART")
p1.plot(x,y2018,'r')
p1.plot(x,y2019,'g')
p1.legend(['sales 2018','sales 2019'],loc=4)
p1.show()
```

Ans. (b)

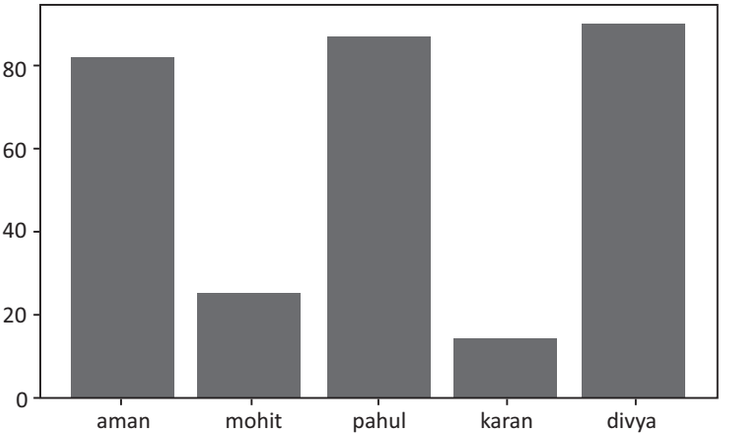


BAR GRAPH

8. Write python code to draw a simple bar graph using name and marks of 5 students.

Ans.

```
import matplotlib.pyplot as p1
x=['aman','mohit','pahul','karan','divya']
y=[82,25,87,14,90]
p1.bar(x,y)
p1.show()
```



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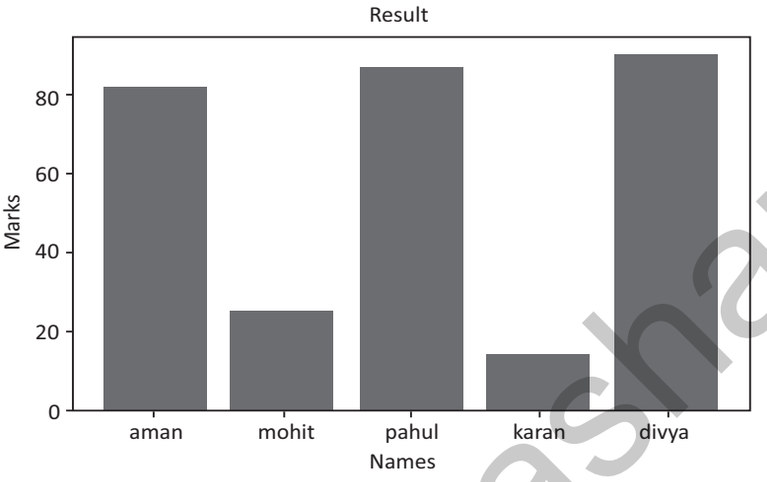
Give title, X axis Label and Y axis Label

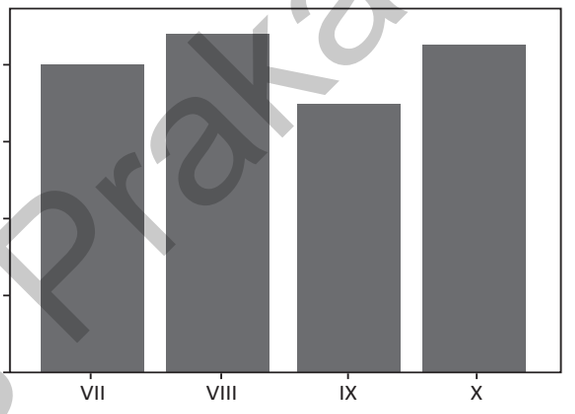
9. Modify the above program and set xlabel as "Names" and ylabel as "Marks"

Ans.
```
import matplotlib.pyplot as p1
x=['aman','mohit','pahul','karan','divya']
y=[82,25,87,14,90]
p1.bar(x,y)
p1.title("Result")
p1.xlabel("Names")
p1.ylabel("Marks")
p1.show()
```



10. Draw the following bar graph representing the number of students in each class. **3[SP 21]**

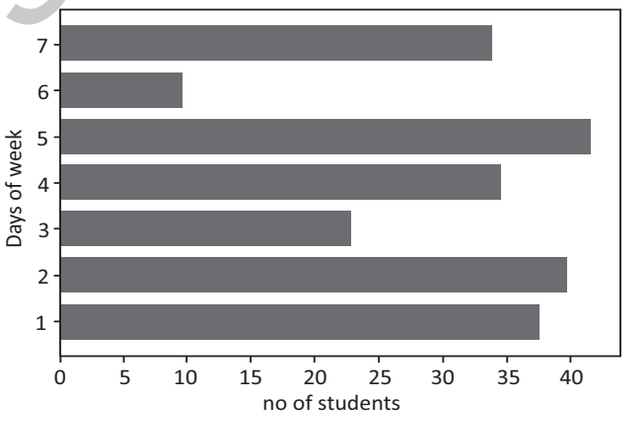
Ans.
```
import matplotlib.pyplot as plt
classes = ['VII','VIII','IX','X']
students = [40,45,35,44]
plt.bar(classes, students)
plt.show()
```



Draw Bargraph Horizontally

11. Write code in python to draw a bargraph horizontally with the given values x and y.
x=[1,2,3,4,5,6,7]
y=[38,40,23,35,42,10,34]
set the xlabel "no of students" and ylabel as "Days of week"

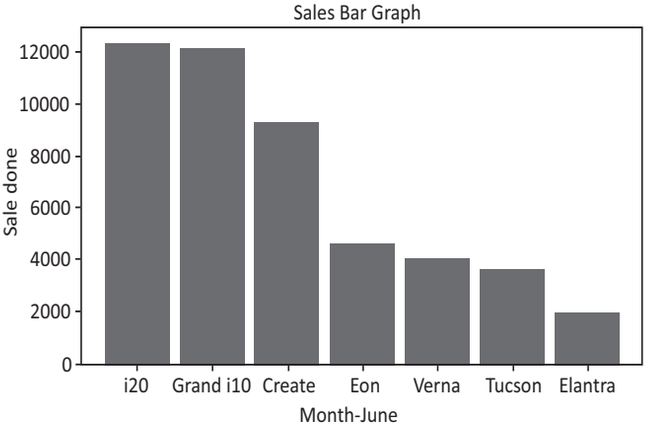
Ans.
```
import matplotlib.pyplot as p1
x=[1,2,3,4,5,6,7]
y=[38,40,23,35,42,10,34]
p1.barh(x,y)
p1.title("Attendance")
p1.xlabel("no of students")
p1.ylabel("Days of week")
```



12. A bar chart is drawn (using pyplot) to represent sales data of various models of cars, for a month. Write appropriate statements in Python to provide labels Month - June and Sale done to x and y axis respectively.

[sp cs 2019-20]

Ans.
```
import matplotlib.pyplot as plt
model=('i20','Grandi10','Creta','Eon','Verna',
'Tucson','Elantra')
sale=[12369,12174,9390,4663, 4077,3712,2000]
plt.bar(model,sale)
plt.xlabel('Month-June')
plt.ylabel('Sale done')
plt.title('Sales Bar Graph')
plt.show()
```



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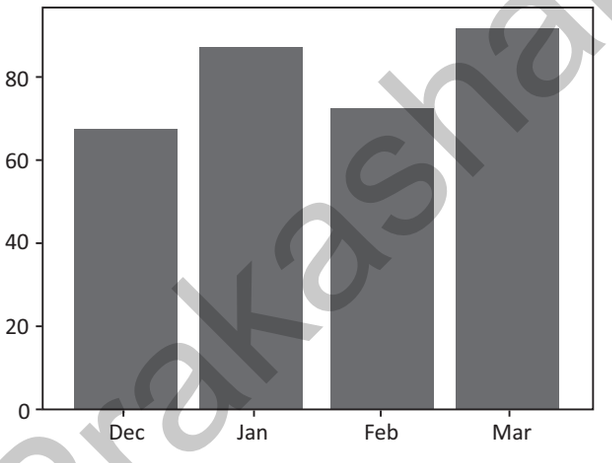
13. Mr. Sanjay wants to plot a bar graph for the given set of values of subject on x-axis and number of students who opted for that subject on y-axis. **[SP 2019-20]**

Complete the code to perform the following :

(i) To plot the bar graph in statement 1

(ii) To display the graph in statement 2

```
import matplotlib.pyplot as plt
x=['Hindi', 'English', 'Science', 'SST']
y=[10,20,30,40]
_____________________ Statement 1
_____________________ Statement 2
```



Ans. (i) `plt.bar(x,y)`

(ii) `plt.show()`

14. Write the output from the given python code: **[CS comptt 2020]**

Ans.
```
import matplotlib.pyplot as plt
Months = ['Dec', 'Jan', 'Feb', 'Mar']
Attendance = [70, 90, 75, 95]
plt.bar(Months, Attendance)
plt.show()
```

15. 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 Profitfigures for the 2nd quarter of the financial year 2019 (i.e. August, September, October, November).

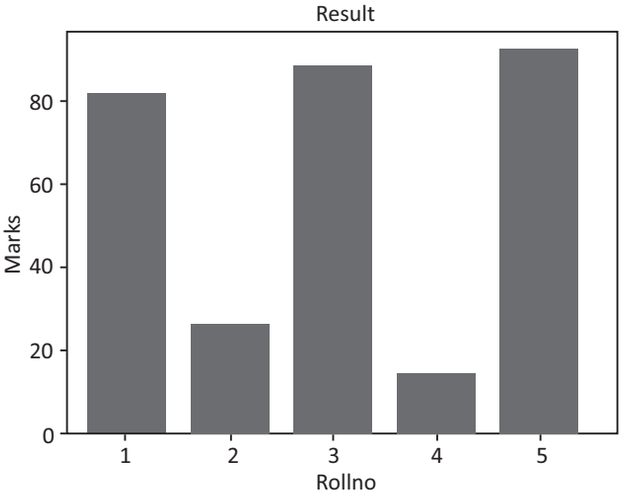
```
import matplotlib.pyplot as mtp
Months = ['AUG', 'SEP', 'OCT', 'NOV'] #X Axis
Profits = [125, 220, 230, 175] #Y Axis
_____________________________________
mtp.show()
```

1[comptt 2020]

Ans. mtp.bar(Months, Profits)

16. On the basis of the given graph, fill in the blanks

```
import matplotlib.pyplot as p1
x=[1,2,3,4,5]
y=[82,25,87,14,90]
p1._____(x,y,color='red')
p1.title('_____')
p1._____('Rollno')
p1.ylabel('_____')
p1.show()
```



Ans.
```
import matplotlib.pyplot as p1
x=[1,2,3,4,5]
y=[82,25,87,14,90]
p1.bar(x,y,color='red')
p1.title('Result')
p1.xlabel('Rollno')
p1.ylabel('Marks')
p1.show()
```

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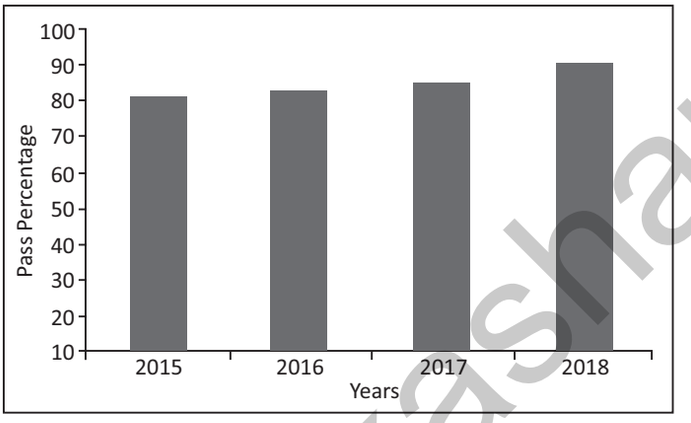
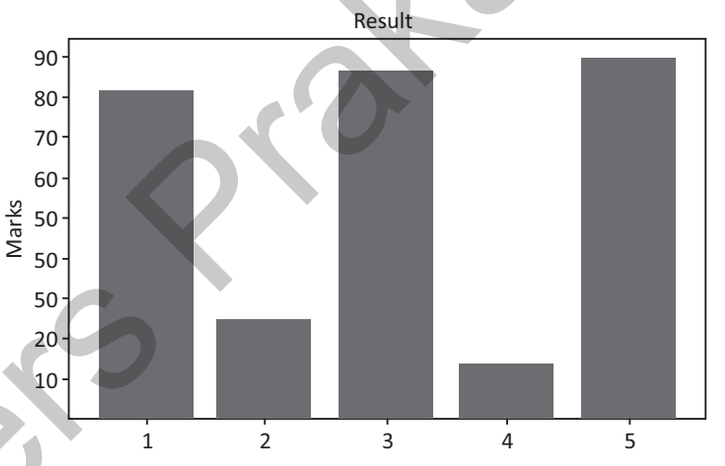
17. Write a code to plot a bar chart to depict the pass percentage of students in CBSE exams for the years 2015 to 2018 as shown below. **[SP 2019-20]**



Ans.
```
import matplotlib.pyplot as plt
import numpy as np
x=['2015','2016','2017','2018']
y=[82,83,85,90]
plt.bar(x,y)
plt.yticks(np.arange(0,110,10))
plt.ylabel('Pass Percentage')
plt.xlabel('Years')
plt.show()
```

18. On the basis of the given bar graph, fill in the blanks




```
import numpy as np
import matplotlib.pyplot as p1
x=[1,2,3,4,5]
y=[82,25,87,14,90]
p1._____(x,y)
p1.yticks(np.arange(10,100,10))
   # p1.yticks([10,20,30,40,50,60,70,80,90])
p1.title("_______")
p1._______("Marks")
p1.show()
```

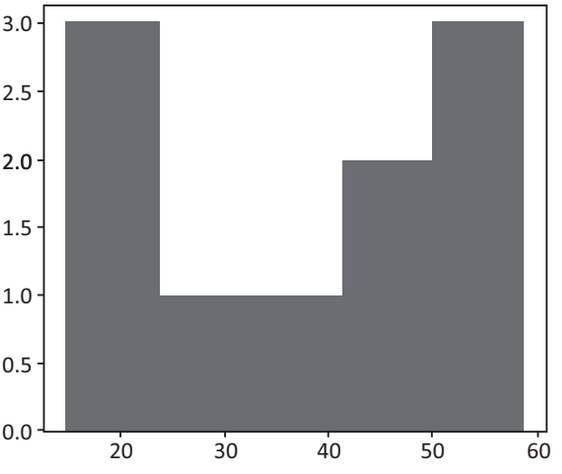
Ans.
```
import numpy as np
import matplotlib.pyplot as p1
x=[1,2,3,4,5]
y=[82,25,87,14,90]
p1.bar(x,y)
p1.yticks(np.arange(10,100,10))
    #  p1.yticks([10,20,30,40,50,60,70,80,90])
p1.title("Result")
p1.ylabel("Marks")
p1.show()
```

HISTOGRAM

You can use Matplotlib to create histogram. Histogram has bins, every bin has the minimum and maximum value, Histogram shows the frequency on vertical axis.

Template to plot a Histogram

```
import matplotlib.pyplot as plt
x = [value1, value2, value3,....]n
plt.hist(x, bins = number of bins)
plt.show()
```



19. Write code to create a Histogram with the given values of x x=[10,15,55,70,10,30,75,89,98,81] and bins=5

Ans.
```
import matplotlib.pyplot as plt
x=[10,15,55,70,10,30,75,89,98,81]
plt.hist(x,bins=5)
plt.show()
```

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How to calculate number of bins

You can set any number of bins according to data. Alternatively, you may derive the bins using the following formulas:

- n = number of observations
- Range = maximum value – minimum value
- # of intervals = √n
- Width of intervals = Range / (# of intervals)

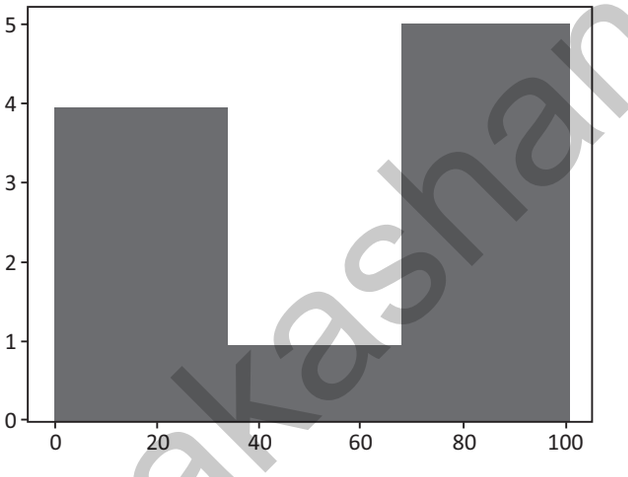
You can create frequency table by using these formulas

Lets take the data from previous question

x=[10,15,55,1,99,75,89,100,81]

Using formulas:

- n = number of observations = 9
- Range = maximum value – minimum value = 100 – 1 = 99
- # of intervals = √n = √9 = 3
- Width of intervals = Range / (# of intervals) = 99/3 = 33



Based on these values we can create frequency table

Intervals(bins)Frequency

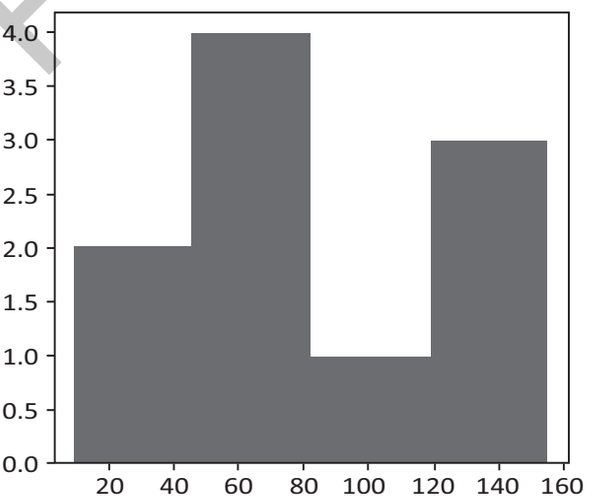
0-33	3
34-67	1
68-101	5

(will not get the exact figure, output may slightly differ)

20. Write code to create a Histogram with the given values of x(4 bins) using facecolor=red

x=[10,10,155,70,50,125,75,149,98,81]

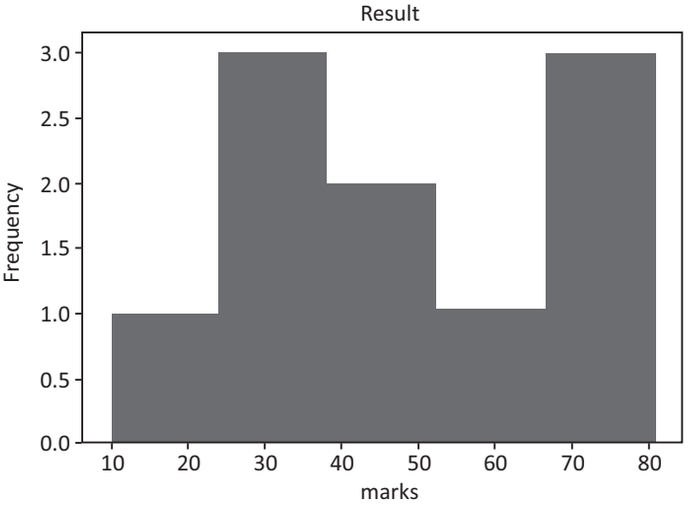
Ans.
```
import matplotlib.pyplot as plt
x=[10,10,155,70,50,125,75,149,98,81]
plt.hist(x,bins=4,facecolor='red')
plt.show()
```



21. On the basis of the given histogram fill the blanks

```
import matplotlib.pyplot as plt
marks=[30,10,55,70,50,25,75,49,28,81]
plt._____(marks, bins='auto', color='green')
plt._____('marks')
plt.ylabel('_____')
plt._____('Result')
plt.show()
```

Ans.
```
import matplotlib.pyplot as plt
marks=[30,10,55,70,50,25,75,49,28,81]
plt.hist(marks, bins='auto', color='green')
plt.xlabel('marks')
plt.ylabel('Frequency')
plt.title('Result')
plt.show()
```



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MULTIPLE CHOICE QUESTIONS

Fill in the blanks :

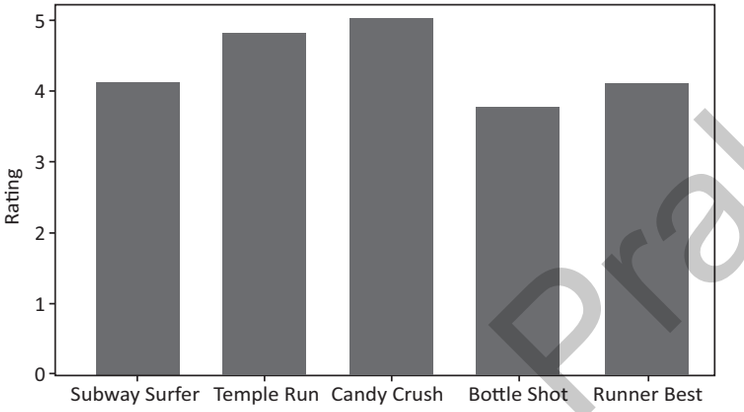
1. The command used to give a heading to a graph is _____ **1[SP 21]**

(a) plt.show() (b) plt.plot() (c) plt.xlabel() (d) plt.title()

2. Using Python Matplotlib _____ can be used to count how many values fall into each interval. **1[SP 21]**

(a) line plot (b) bar graph (c) histogram (d) None of these

3. Mr. Sharma is working in a game development industry and he was comparing the given chart on the basis of the rating of the various games available on the play store. He is trying to write a code to plot the graph. Help Mr. Sharma to fill in the blanks of the code and get the desired output. **[CBSE QB]**




```
import_____________________________ #Statement 1
Games=["Subway Surfer","Temple Run","Candy Crush","Bottle Shot","Runner Best"]
Rating=[4.2,4.8,5.0,3.8,4.1]
plt._____________(Games,Rating) #Statement 2
plt.xlabel("Games")
plt._____________("Rating") #Statement 3
plt._____________ #Statement 4
```

(i) Choose the right code from the following for statement 1.

(a) matplotlib as plt (b) pyplot as plt

(c) matplotlib.pyplot as plt (d) matplotlib.plt as pyplot

(ii) Identify the name of the function that should be used in statement 2 to plot the above graph.

(a) line() (b) bar() (c) hist() (d) barh()

(iii) Choose the correct option for the statement 3.

(a) title("Rating") (b) ytitle("Rating") (c) ylabel("Rating") (d) yaxis("Rating")

(iv) Choose the right function/method from the following for the statement 4.

(a) display() (b) print() (c) bar() (d) show()

(v) In case Mr. Sharma wants to change the above plot to any other shape, which statement, should he change.

(a) Statement 1 (b) Statement 2 (c) Statement 3 (d) Statement 4

4. Gaurav has written a Python Code to create a bar plot as given below using the following data: **[CBSE QB]**

City	Happiness_Index Male	Happiness_Index Female
Delhi	60	30
Beijing	40	60
Washington	70	70
Tokyo	65	55
Moscow	85	75

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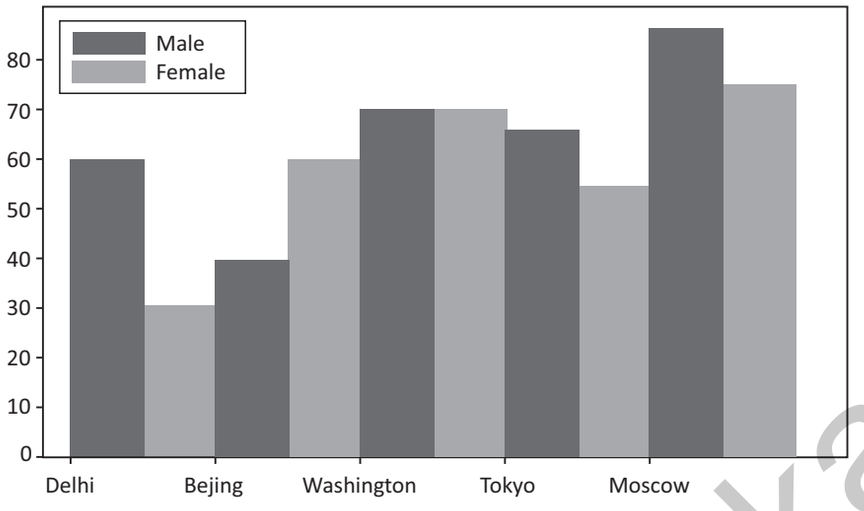


```
import ________as________                                    #Statement 1
City=['Delhi','Beijing','Washington','Tokyo','Moscow']
Gender=['Male','Female'] Happiness_Index_Male=[60,40,70,65,85]
Happiness_Index_Female=[30,60,70,55,75]
plt.bar([0.25,1.25,2.25,3.25,4.25],Happiness_Index_
Male,color='blue',label="Male",width=.5)
plt._________________([.75,1.75,2.75,3.75,4.75],Happiness_
Index_Female,color='Green',width=.5,label="Female")
#Statement 2
pos=range(len(City)) print(pos)
plt.xticks(pos,City,fontsize=10)
plt.xlabel('City', fontsize=16)
plt.ylabel('Happiness_Index', fontsize=16)
_______ #Statement 3
_______ #Statement 4
_______ #Statement 5
```

(i) Identify the suitable code to be used in the blank space in line marked as Statement1.

(a) matplotlib as plt (b) numpy as np

(c) pandas as pd (d) matplotlib.pyplot as plt

(ii) What is the name of the function to plot the required bar graph in the line marked as Statement 2

(a) hist() (b) pie() (c) bar() (d) scatter()

(iii) Fill in the blank in statement 3 to set Chart Title as "Happiness Index across cities by gender"and font size as 18.

(a) plt.xtitle("Happiness Index across cities by gender",fontsize=18)

(b) plt.title("Happiness Index across cities by gender",fontsize=18)

(c) plt.ytitle("Happiness Index across cities by gender",fontsize=18)

(d) plt.show("Happiness Index across cities by gender",fontsize=18)

(iv) Identify the suitable code for line marked as Statement 4 to display the legends as shown in the plot.

(a) plt.showlegend() (b) plt.legend() (c) plt.display() (d) plt.show()

(v) Fill in the blank marked in Statement 5 to display the plot.

(a) plt.plot() (b) plt.showplot() (c) plt.display() (d) plt.show()

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5. Fill in the blanks :

(i) The command used to draw a bar graph is _____

(a) p1.bargraph(x,y) (b) p1.bar(x,y) (c) p1.bgraph(x,y) (d) p1.graphbar(x,y)

(ii) The command used to draw a bar graph horizontally is _____

(a) p1.barhor(x,y) (b) p1.hbar(x,y) (c) p1.barh(x,y) (d) p1.graphbarh(x,y)

(iii) The command used to display the graph is _____

(a) plt.show() (b) plt.plot() (c) plt.display() (d) plt.disp()

(iv) The command used to set the label of x axis is _____

(a) plt.xaxis() (b) plt.labelx() (c) plt.xtitle() (d) plt.xlabel()

(v) Fill in the blanks :

The command used to set the label of y axis is _____

(a) plt.yaxis() (b) plt.labely() (c) plt.ytitle() (d) plt.ylabel()

6. Give single line python code to set the heading of a Line Graph is "Result"

7. Fill the missing statement

```
import matplotlib.pyplot as plt
marks=[30,10,55,70,50,25,75,49,28,81]
plt._____(marks, bins='auto', color='green')
plt.show()
```

(a) plot (b) bar (c) hist (d) hist

ANSWERS

1. (d) **2.** (c)
3. (i) (c) (ii) (b) (iii) (c) (iv) (d) (v) (b)
4. (i) (d) (ii) (c) (iii) (b) (iv) (b) (v) (d)
5. (i) (b) (ii) (c) (iii) (a) (iv) (d) (v) (d)
6. p1.title("Result") **7.** (c)

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4 Societal Impacts

DIGITAL FOOTPRINTS

1. What is a digital footprint?

Ans. A digital footprint is data that is left behind when users have been online. There are two types of digital footprints which are passive and active. Examples of dgital footprint are websites that install cookies on your devices, apps and websites that use your geolocation, and social media that use your likes, shares and comments to profile.

2. What are the two types of digital footprint?

Ans. There are two main types of digital footprint: passive and active.

A *passive digital footprint* is data you leave behind without knowing when using the internet. For example, your IP address, approximate location, or browser history. A passive footprint is made when information is collected from the user without the person knowing this is happening.

An *active digital footprint* is created when you deliberately submit information

3. Priyanka is using her internet connection to book a flight ticket. This is a classic example of leaving a trail of web activities carried by her. What do we call this type of activity? What is the risk involved by such kind of activity? **2[SP 21]**

Ans. We call this type of activity as Digital Footprints

Risk involved: It includes websites when she sends emails and any information she submit online, etc., along with the computer's IP address, location, and other device specific details. Such data could be used for targeted advertisement or could also be misused or exploited.

NET AND COMMUNICATION ETIQUETTES

4. What do you understand by Net Etiquettes? Explain any two such etiquettes. **3[SP 21]**

Ans. Net etiquettes refers to the proper manners and behaviour we need to exhibit while being online.

These include :

(i) *No copyright violation:* We should not use copyrighted materials without the permission of the creator or owner. We should give proper credit to owners/creators of open source content when using them.

(ii) *Avoid cyber bullying:* Avoid any insulting, degrading or intimidating online behaviour like repeated posting of rumours, giving threats online, posting the victim's personal information, or comments aimed to publicly ridicule a victim.

(iii) *Data Protection*

5. What do you mean by Identity theft? Explain with the help of an example. **3[SP 21]**

Ans. Identity theft is the crime of obtaining the personal or financial information of another person for the sole purpose of assuming that person's name or identity to make transactions or use it to post inappropriate remarks, comments, etc.

Example: Alex likes to do his homework late at night. He uses the Internet a lot and also sends useful data through email to many of his friends. One Day he forgot to sign out from his email account. In the morning, his twin brother, Flex started using the computer. He used Flex's email account to send inappropriate messages to his contacts.

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6. What is a Unique Id? Write the name of the Unique Identification provided by Government of India for Indian Citizens. **[2][comptt 2020]**

Ans. Unique identifier (UID) is any identifier which is guaranteed to be unique among all objects and is used for identifying various objects. The Unique Identification provided by the Government of India for Indian Citizens is Aadhaar.

7. What can be done to reduce the risk of identity theft? Write any two ways. **2[CS SP 2019-20]**

Ans. Follow steps to reduce the risk of identity theft:

(i) Don't Give out Personal Information to anyone

(ii) Don't Carry Your Social Security Card.

Firewall

8. Define Firewall. **[SP 14]**

Ans. Firewall is hardware or software based network security system. It prevents unauthorized access to or from a network.

9. What do you understand by the term Firewall? What is it used for?

Ans. Refer to Q8 above.

10. What term we use for a software/hardware device, which is used to block, unauthorized access while permitting authorized communications. This term is also used for a device or set of devices configured to permit, deny, encrypt, or proxy all (in and out) computer traffic between different security domains based upon a set of rules and other criteria. **[D 10]**

Ans. Firewall

11. How is firewall useful in ensuring network security? **[OD 16]**

Ans. A Firewall permits only that data to enter or leave a computer/Network for which permissions have been granted by the computer/network administrator.

12. Explain two measures that a school should take to ensure security of their computer network. **[compt 2017]**

Ans. Use a firewall and be careful when using computer.

13. Name the following devices:

(i) This device constantly looks at all the data entering and exiting your connection. It can block or reject data in response to an established rule.

(ii) This device connects multiple nodes to form a network. It redirects the received information only to the intended node(s). **2 [2018]**

Ans. (i) Firewall (ii) Switch

14. Explain the terms Firewall and Cyber Law. **2 [D 17]**

Ans. **Firewall:** A Firewall is a hardware/software that permits only authorised data to enter/leave the network.

Cyber Law: Cyber Law is the law that deals with offences related to data/information stored on computers or networked devices/solutions.

15. To prevent unauthorized access to and or from the network, a system known as _____, can be implemented by hardware and/or software **[SP 21]**

Ans. Firewall

16. Ms. Sita trying to log into your Internet Banking account for online transaction activity. However, as strange as it may seem, she is denied of an access to the bank's website, in spite of having a swift internet connection. What do you think the reason behind this problem is and suggest her few simple precautions in order to overcome any such type of network security threats. **2[SP18]**

Ans. She could be under a DoS attack! She should deploy an antivirus program and firewall into her network if not already done. This helps in restricting the bandwidth usage to authenticated users only.

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INTELLECTUAL PROPERTY

17. What is Intellectual property?

Ans. Intellectual property refers to creations of the mind: inventions; literary and artistic works; and symbols, names and images used in commerce.

18. What are the different types of Intellectual property?

Ans. There are four primary types of intellectual property (IP) that can be legally protected: patents, trademarks, copyrights, and trade secrets.

Copyright

19. What is copyright?

Ans. A copyright is a collection of rights that automatically vest to someone who creates an original work of authorship – like a literary work, song, movie or software. It allows the copyright owner to protect against others copying or reproducing their work

The following types of works are allowed protection under the copyright law:

- Literary Works. ...
- Musical Works. ...
- Dramatic Works. ...
- Pantomimes and Choreographic Works. ...
- Pictorial, Graphic, and Sculptural Works. ...
- Motion Pictures and Other Audiovisual Works. ...
- Sound Recordings. ...
- Compilations.

20. What things can not be copyrighted?

Ans. Ideas, Methods, or Systems. Ideas, methods, and systems are not covered by copyright protection. ...

Commonly Known Information. This category includes items that are considered common property and with no known authorship. ...

Choreographic Works. ...

Names, Titles, Short Phrases, or Expressions. ...

Fashion

21. What is the difference between copyright and license?

Ans. Copyright is the legal term used to declare and prove who owns the intellectual property (the code, text, etc.). Licensing is the legal term used to describe the terms under which people are allowed to use the copyrighted material. Only the copyright owner (or their agent) can enter in to a license agreement.

Plagiarism

22. What is plagiarism?

Ans. The act of plagiarism simply involves taking someone else's work and/or ideas and using them as your own, rather than giving credit to the rightful owner or receiving consent before taking the material.

23. Plagiarism is wrong, or right?

Ans. It's wrong because it is a literary theft and academic misconduct.

24. Is copy from internet called plagiarism?

Ans. Yes, we cannot copy anything from internet no matter whether it belongs to a book/journal/or from a web source without giving reference to the source. All you needs to do is give due credit to the source from where ever you have taken.

25. Why does student plagiarize?

Ans. There are many reasons for students to do plagiarize:

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(i) **Study pressure:** It is one of the reasons why do students plagiarize in academic writing. Students are busy with lot many things like assignments/presentations/term end examinations and along with that they also have to write their synopsis/papers so may be this is one of the reason they find it easy to cut/copy and paste.

(ii) Disorganization: Disorganizations is when lot many thing going in your mind what to do what not to do and what to do first ..What to do later…somewhere in between you may thing of just copying from internet or from any other source.

(iii) Poor study habits: When students do not take much interest in their research/work. They just take it very casually and they try to find any easy way of completing their assignment or whatever work they have been assigned.

(iv) Lack of strict academic discipline

Lack of understanding the implications of plagiarism, sometimes students as well as even teachers are not aware of consequences of plagiarism. It can sometimes lead to plagiarism.

26. The practice of taking someone else's work or ideas and passing them off as one's own is known as _____ **[SP 21]**

Ans. Plagiarism

27. Write names of any two common types of Intellectual Property Rights which are protected by the Law. **[comptt 2020]**

Ans. Types of Intellectual Property Rights (Any two from the following):

- Rights upon musical, literary, and artistic works
- Rights upon discoveries and inventions
- Words, phrases, symbols, and designs
- Copyrights, trademarks, patents, industrial design rights and trade secrets

E-WASTE

28. What is e-waste and why is it a problem?.

Ans. The term "e-waste" is an abbreviation of "electronic and electrical waste". E-Waste is a term used to cover items of all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without the intention of re-use.

People replace things: smartphones, tablets, phablets, laptops, LEDs, LCDs, DVD players, portable music players. Whether from breakdown, slow-down, or just the availability of a newer model, people discard electronics at the slightest inconvenience.

The increase in consumption of electronics has two major adverse ecological effects. First, it significantly increases mining and procurement for the materials needed for production of gadgets. And second, discarded devices produce large quantities of electronic waste. That waste could be reduced through reuse, repair, or resale.

29. What are the problems caused by e-waste?

Ans. Electronic devices also comprise toxic heavy metals like lead, mercury, cadmium and beryllium, polluting PVC plastic, and hazardous chemicals, such as brominated flame retardants, which can harm human health and the environment.

30. What is the solution to e-waste.

Ans. The solution of e-waste:

(i) Recycling: Electronic devices are made of a complex mix of materials that include gold, silver, copper, platinum, palladium, lithium, cobalt and other valuable elements. These precious materials can be reclaimed through recycling.

(ii) Designing better products: In order to reduce e-waste, manufacturers need to design electronics that are safer, and more durable, repairable and recyclable. Most importantly, this means using less toxic materials.

(iii) The right to repair: In addition to recycling, it's also important to be able to repair and reuse the devices we have. But even if you know how to and want to repair your electronic device, you cannot do it because

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your product's software is subject to copyright. The copyright often forbids consumers by law to use an unauthorized repairer. So the people should have the right to repair devices and teaches people how to do it.

Finally,the best thing you can do is to resist buying a new device until you really need it. Try to get your old product repaired if possible and if it can't be fixed, resell or recycle it responsibly.

31. According to a survey, one of the major asian country generates approximately about 2 million tonnes of electronic waste per year. Only 1.5% of the total e-waste gets recycled. Suggest a method to manage e-waste. **[SP 21]**

Ans. Buy environmentally friendly electronics Donate used electronics to social programs Reuse, refurbish electronics Recycling e-waste

32. As a citizen of india, What advise you should give to others for e-waste disposal? **1[CS SP 2019-20]**

Ans. As a citizen of india, We can advice the following principle of waste management:
Reduce, Reuse and Recycle.

33. Ms Samtha has many electronics gadgets which are not usable due to outdated hardware and software. Help her to find any three best ways to dispose the used electronic gadgets. **[SP 20]**

Ans. (i) Give Your Electronic Waste to a Certified E-Waste Recycler
(ii) Donating Your Outdated Technology
(iii) Give Back to Your Electronic Companies and Drop Off Points

Awareness about health concerns related to the usage of technology

34. List any two health hazards related to excessive use of Technology. **2[SP 21]**

Ans. The continuous use of devices like smartphones, computer desktop, laptops, head phones etc cause a lot of health hazards if not addressed. These are:

(i) *Impact on bones and joints:* wrong posture or long hours of sitting in an uncomfortable position can cause muscle or bone injury.

(ii) *Impact on hearing:* using headphones or earphones for a prolonged time and on high volume can cause hearing problems and in severe cases hearing impairments.

(iii) *Impact on eyes:* This is the most common form of health hazard as prolonged hours of screen time can lead to extreme strain in the eyes.

(iv) *Sleep problem:* Bright light from computer devices block a hormone called melatonin which helps us sleep. Thus we can experience sleep disorders leading to short sleep cycles.

HACKERS AND CRACKERS

35. Who is a hacker?

Ans. Hackers are the good people who do hacking with a good purpose. Hackers are also known as White Hats or saviour. They are the programmers or computer experts with adequate knowledge of programming and coding who find the loopholes present in a system and try to cover them and hence protect the system. The hackers try and remove the flaws in the system, making it more secure. They never work with the objective of harming the system or stealing and misusing the data.

36. How is a Hacker different from a Cracker?

Ans. The general view is that, while hackers build things, crackers break things. Crackers also have the same knowledge of the systems, programming and coding as the hackers do. They also perform the same activities as hackers do. However, their objective is of breaking the system and network to gain unauthorized access. This is the main difference between hacker and cracker. The activity performed by crackers is illegal. They use their coding and programming knowledge to get personal and financial gains, steal data, destroy data or even delete crucial data..

37. Jai is an IT expert and a freelancer. He recently used his skills to access the Administrator password for the network server of Megatech Corpn Ltd. and provided confidential data of the organization to its Director, informing him about the vulnerability of their network security. Out of the following options (i) to (iv), which one most appropriately defines Jai. Justify the reason for your chosen option:

(i) Hacker (ii) Cracker (iii) Operator (iv) Network Admin

Ans. (i) Hacker: A Hacker is a person who breaks into the network of an organization without any malicious intent.

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CYBER CRIME AND CYBER LAW

38. What is the significance of Cyber Law?

Ans. Cyber law is a term used to describe the legal issues related to use of communications technology, particularly "cyberspace", i.e. the Internet.

39. What is cyber crime?

Ans. Cyber crime is a crime that involves a computer and a network. The computer may have been used in the commission of a crime, or it may be the target. Cyber crime may harm someone's security and financial health. We can categorize Cyber crimes in two ways:

(i) **The Computer as a Target:** using a computer to attack other computers, e.g. Hacking, Virus/Worm attacks, DOS attack etc.

(ii) **The computer as a weapon:** using a computer to commit real world crimes, e.g. Cyber Terrorism, IPR violations, Credit card frauds, EFT frauds, Pornography etc. Cyber Crime is regulated by Cyber Laws or Internet Laws.

40. Which of the following crime(s) is/are covered under cyber crime?

(i) Stealing brand new hard disk from a shop.
(ii) Getting into unknown person's social networking account and start messaging on his behalf.
(iii) Copying some important data from a computer without taking permission from the owner of the data.

Ans. (ii) and (iii)

41. Which out of the following comes under Cyber Crime?

(i) Operating someone's Internet banking account, without his knowledge.
(ii) Stealing a keyboard from someone's computer.
(iii) Working on someone's computer with his/her permission.
(iv) Looking at online activities of a friends blog.

Ans. (i) Operating someone's Internet banking account, without his knowledge.

42. Out of the following, which all comes under cyber crime?

(i) Stealing away a brand new computer from a showroom.
(ii) Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.
(iii) Secretly copying files from server of a call center and selling it to the other organization.
(iv) Viewing sites on a internet browser.

Ans. (ii) and (iii)

43. Out of the following, which all comes under cyber crime?

(i) Stealing away a brand new hard disk from a showroom.
(ii) Getting in someone's social networking account without his consent and posting on his behalf.
(iii) Secretly copying data from server of a organization and selling it to the other organization.
(iv) Looking at online activities of a friends blog.

Ans. (ii) and (iii)

44. Jhilmalini has stolen a credit card. She used that credit card to purchase a laptop. What type of offence has she committed? **1[SP 20]**

Ans. She has committed a fraud.

45. Identify the type of cyber crime for the following situations: **[SP 2019-20]**

(i) A person complains that ₹4.25 lacs have been fraudulently stolen from his/her account online via some online transactions in two days using NET BANKING.
(ii) A person complaints that his/her debit/credit card is safe with him still some body has done shopping/ATM transaction on this card.
(iii) A person complaints that somebody has created a fake profile on Facebook and defaming his/her character with abusive comments and pictures.

Ans. (i) Bank Fraud (ii) Identity Theft (iii) Cyber Stalking

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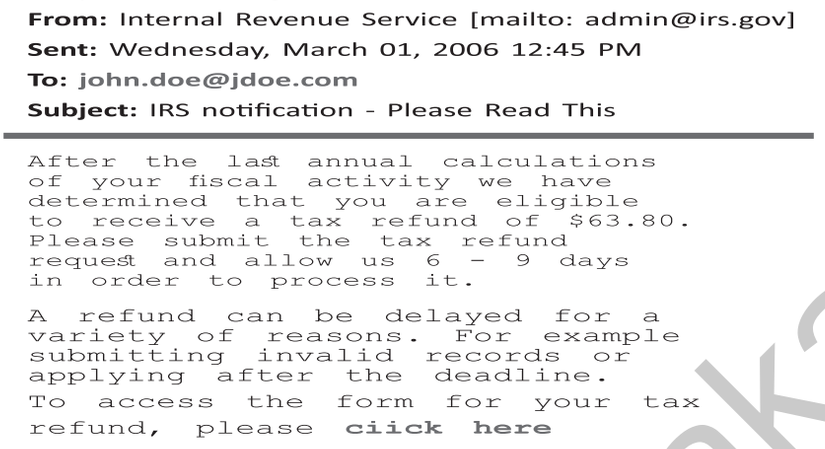
PHISHING

46. Ravi received a mail form IRS department (as shown below). On clicking " ClickHere" ,he was taken to a site designed to imitate an official-looking website, such as IRS.gov. He uploaded some important information on it. Identify and explain the cyber crime being discussed in the above scenario. **[CS SP 2019-20]**



From: Internal Revenue Service [mailto: admin@irs.gov]
Sent: Wednesday, March 01, 2006 12:45 PM
To: john.doe@jdoe.com
Subject: IRS notification - Please Read This

After the last annual calculations of your fiscal activity we have determined that you are eligible to receive a tax refund of $63.80. Please submit the tax refund request and allow us 6 - 9 days in order to process it.

A refund can be delayed for a variety of reasons. For example submitting invalid records or applying after the deadline.
To access the form for your tax refund, please **ciick here**

Ans. It is an example of phishing. Phishing is a term used to describe a malicious individual or group of individuals who scam users. They do so by sending e-mails or creating web pages that are designed to collect an individual's online bank, credit card, or other login information.

47. Name the primary law in India dealing with cyber crime and electronic commerce. **1[SP 20]**

Ans. The primary law is Information Technology Act 2000.

48. Sutapa received an email from her bank stating that there is a problem with her account. The email provides instructions and a link, by clicking on which she can logon to her account and fix the problem. Help Sutapa by telling her the precautions she should take when she receives these type of emails. **2[SP 20]**

Ans. She should check whether it is a valid bank site or not by checking in the url https. It is always better to type the url and then login to the site. She should not click on the link provided in the email.

IT ACT

The Information Technology Act, 2000 (also known as ITA-2000, or the IT Act) is an Act of the Indian Parliament notified on 17 October 2000. It is the primary law in India dealing with cyber crime and electronic commerce.
List of some Offence:

- Tampering with computer source documents
- Receiving stolen computer or communication device
- Cheating using computer resource
- Failure to maintain records
- Hacking with computer system
- Using password of another person
- Publishing private images of others

49. Name the primary law in India dealing with cybercrime and electronic commerce. **1[SP 20]**

Ans. The primary law is Information Technology Act 2000.

CYBERBULLYING

50. What is cyberbullying?

Ans. Cyberbullying includes sending, posting, or sharing negative, harmful, false, or mean content about someone else. It can include sharing personal or private information about someone else causing embarrassment or humiliation.
Example of cyberbullying:

- Sending mean texts or IMs to someone.
- Pranking someone's cell phone.
- Hacking into someone's gaming or social networking profile.
- Being rude or mean to someone in an online game.
- Spreading secrets or rumours about people online.

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OPEN SOURCE SOFTWARE

51. What is open source software? Write the names of any two software which can be categorized as Open Source. **2[comptt 2020]**

Ans. Open source software is software with source code that anyone can inspect, modify, and enhance.
Names of open source software (Any two):

- Mozilla's Firefox web browser.
- PHP scripting language.
- Apache HTTP web server.
- GNU Image Manipulation Program
- Thunderbird email client.
- Python programming language.
- LibreOffice
- Linux operating system

52. Which of the following is not a characteristic of Open Source Software? **[2011 SP]**

(i) Its source code is available for modification
(ii) It is owned by a company or an individual
(iii) It can be downloaded from internet

Ans. (ii) It is owned by a company or an individual

53. Ms. Vidya Chauhan is confused between Proprietary Software and Open Source Software. Mention at least two points of difference to help her understand the same. **[2011 OD]**

OR

Distinguish between Open Source software and Proprietary Software. **[2014 OD]**

OR

Distinguish between Open Source Software and Proprietary software with reference to customizability of the software? **[SP 11]**

Ans. Difference between:

Open Source Software	Proprietary Software
Source Code is available	Source Code is not available.
Modifications to source code can be done	Modifications to source code cannot be done
Supported by a community of users and developers	Supported by vendors at a cost
Generally no license fee	License fee is charged
Example : Open Office	Example: Microsoft Office

54. Write examples of one proprietary and one open source software. **[2012 D]**

Ans. Proprietary Softwares : Microsoft windows, Adobe Photoshop
Open source software: MySQL, Java

55. Expand the following terms :

(i) OSS **[2014 OD]**
(ii) ODF **[OD 14,D 13]**
(iii) XML **[D 13]**
(iv) FLOSS **[OD 13]**
(v) HTTP **[OD 13]**

Ans. (i) Open Source Software
(ii) Open Document Format
(iii) XML : Extensible Markup Language
(iv) FLOSS : Free Libre and Open Source software
(v) HTTP : Hypertext Transfer Protocol

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56. Name one open source indian operating system. **[2015 D]**

Ans. BOSS (Bharat Operating Systems Solutions)

57. Write one advantage and one disadvantage of Open Source software over Proprietary software. **[2015 OD]**

Ans. Advantages of Open Source software over Proprietary software any one:

(i) Free to use, distribute, and modify

(ii) No dependence on the developer for updates, support, and fixes.

(iii) Uses Open Standards

Disadvantages of Open Source software over Proprietary software any one:

(i) Lack of Software Support

(ii) Generally low Security

58. Write down any two advantages of Open Source Software over Proprietary software. **[SP 18]**

Ans. Advantages:

(i) Source code is available.

(ii) Money need not to be paid for procuring the license for usage and further distribution.

59. Which of the following softwares are Open Source: **[SP 11]**

Linux, MS Windows 7, Photoshop, MySql

Ans. Linux and MySQL

60. "Open Source Software developers work for the good of community". Is this statement true? Give reason. **[D 16]**

Ans. Yes, the above statement is true. These include:

(i) Open source developers choose to make the source code of their software publicly available to which many developers can view/use the software and also modify it.

(ii) Users can download the software free of cost. So, they work for the good of the community.

61. What is the meaning of 'Open source' in the term 'Open Source Database Management System'? **[OD 16]**

Ans. Open source means that the software can be studied, copied, redistributed freely and even modified according to one's need without seeking any kind of permission. In order to modify such software, the developers also provide the source code to the users

62. Which of the following are open source software:

GNU, MS-Office, BOSS, Windows OS

Ans. GNU, BOSS

63. Write two examples each of software in the following categories:

(i) Open Source Operating System

(ii) Open Source Web Browser **2 [2018]**

Ans. (i) Linux, Android, FreeBSD, OpenBSD, NetBSD, DragonFly BSD, OpenSolaris, illumos, AuroraUX, Darwin, OpenDarwin, MINIX, FreeRTOS, FreeDOS, Haiku, House KolibriOS, MenuetOS, GNU, ReactOS, L4, Fiasco, Pistachio, Plan 9, AROS, Syllable, Inferno, NuttX, eCos, RTEMS, HelenOS, E/OS, TempleOS, Linux, BOSS, Ubuntu, Kali Linux

(ii) Mozilla Firefox, Google Chrome, Opera, QupZilla, Midori, rekonq, Tor Browser, NetSurf, Pale Moon, GNOME Web.

64. Name the government organization that contributes to the growth of FOSS in India.

Ans. National Resource Centre for free and open source software (NRCFOSS) is the government organization that contributes to the growth of FOSS in India.

65. Does Open source software only mean that the software is free of cost? Give reason for your answer. **2 [OD17]**

Ans. No, it does not only mean that the software is free of cost.

Reason: It also means that the source code is available to user with freedom to use, modify and distribute

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66. Differentiate between open source and open data. **2 [CS SP 2019-20]**

Ans. These licenses are based on the copyright protection of the code.
Thus, the "open" of open source refers to the source code. Difference between open data and open source is that of data versus application. Data can be numbers, locations, names, etc.

67. After realising the issues with proprietary software, Ms. Sunita has decided to use only Open Source Software. Suggest any one suitable open source software to her, for each of the following categories:
(i) Operating System
(ii) Browser **1[SP 17]**

Ans. (i) Linux or Google Chrome OS or any other open source OS
(ii) Mozilla Firefox or Google Chrome or any other open source browser

68. Expand the following:
(i) ODF (ii) PPP **1[SP 17]**

Ans. (i) Open Document Format
(ii) Point to Point Protocol

MULTIPLE CHOICE QUESTIONS

1. An organisation purchases new computers every year and dumps 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] [comptt 2020 cs]**
(a) Solid Waste (b) Commercial Waste (c) E-Waste (d) Business Waste

2. 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[comptt 2020]**
(a) Business Waste (b) Commercial Waste
(c) Solid Waste (d) E-Waste

3. Ms. Raveena Sen is an IT expert and a freelancer. She recently used her skills to access the Admin password for the network server of Super Dooper Technology Ltd. and provided confidential data of the organization to its CEO, informing him about the vulnerability of their network security. Out of the following options (a) to (d), which one most appropriately defines Ms. Sen?
(a) Hacker (b) Cracker (c) Operator (d) Network Admin

4. Pratibha is an IT expert and a freelancer. She is undertakes those jobs, which are related to setting up security software/tools and managing networks in various companies. If we name her role in these companies, what it will be out of the following: **[comptt 2017]**
(a) Cracker (b) Network Admin (c) Hacker (d) Operator

5. Which out of the following does not come under Cyber Crime?
(a) Copying data from the social networking account of a person without his/her information & consent.
(b) Deleting some files, images, videos, etc. from a friend's computer with his consent.
(c) Viewing and transferring funds digitally from a person's bank account without his/her knowledge.
(d) Intentionally making a false account on the name of a celebrity on a social networking site.

6. The school offers Wi-Fi to the students of Class XII. For communication, the network security-staff of the school is having a registered URL "schoolwifi.edu". On 17th September 2017, emails were received by all the students regarding expiry of their passwords. Instructions were also given renew their password within 24 hours by clicking on particular URL provided. On the bases of the above case study, answer the questions given below. Specify which type of cybercrime is it. **[CBSE QB]**
(a) Spamming (b) Phishing (c) Identity Theft (d) Hacking

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7. Data which has no restriction of usage and is freely available to everyone under Intellectual Property Rights is categorised as: **[comptt 2020 cs], [1] [comptt 2020 cs]**

(a) Open Source (b) Open Data (c) Open Content (d) Open Education

8. Consider the following scenario and answer the questions which follow: **[comptt 2020 cs]**

"A student is expected to write a research paper on a topic. The student had a friend who took a similar class five years ago. The student asks his older friend for a copy of his paper and then takes the paper and then submits the entire paper as his own research work."

(i) Which of the following activities appropriately categorises the act of the writer?

(a) Plagiarism (b) Spamming (c) Virus (d) Phishing

(ii) Which kind of offense out of the following is made by the student? **[2]**

(a) Cyber Crime (b) Civil Crime

(c) Violation of Intellectual Property Rights (d) None of these

9. 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[comptt 2020]**

(a) Spamming (b) Phishing (c) Plagiarism (d) Trojan

10. Which of the following is not an intellectual property? **1[SP 20]**

(a) A poem written by a poet (b) An original painting made by a painter

(c) Trademark of a Company (d) A remixed song

11. Sumit has to prepare a project on "Swachh Bharat Shreshth Bharat". He decides to get information from the Internet. He downloads three web pages (webpage1, webpage 2, webpage 3) containing information on the given topic. **[CBSE QB]**

1. He read a paragraph on from webpage 1 and rephrased it in his own words. He finally pasted the rephrased paragraph in his project.
2. He downloaded three images of from webpage 2. He made a collage for his project using these images.
3. He also downloaded an icon from web page 3 and pasted it on the front page of his project report.

(i) Step 1 : An Example of _____

(a) Plagiarism (b) Paraphrasing

(c) Copyright infringement (d) Intellectual Property Right

(ii) Step 2 : An act of _____

(a) Plagiarism (b) Copyright infringement

(c) Intellectual Property Right (d) Digital Footprints

(iii) Step 3 : An act of _____

(a) Plagiarism (b) Paraphrasing

(c) Copyright infringement (d) Intellectual Property Right

(iv) A website is a collection of _____

(a) Web servers (c) Web pages (c) Browsers (d) Hyperlinks

(v) The process of getting web pages, images and files from a web server to local computer is called

(a) FTP (b) Uploading (c) Downloading (d) Remote access

ANSWERS

1. (c) **2.** (d) **3.** (i) **4.** (iii) **5.** (ii) **6.** (b) **7.** (b) **8.** (i) (a) (ii) (c)
9. (c) **10.** (b) **11.** (i) (b) (ii) (a) (iii) (c) (iv) (b) (v) (c)

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CBSE SAMPLE QUESTION PAPER

SECTION : B

(Released by CBSE for the academic year 2021-22)

Time Allowed : 90 Minutes | Maximum Marks : 35

General Instructions :

- *The paper is divided into 3 Sections- A, B and C.*
- *Section A, consists of Question 1 to 25 and student need to attempt 20 questions.*
- *Section B, consists of Question number 26 to 49 and student need to attempt 20 questions.*
- *Section C, consists of Question number 50 to 55 and student need to attempt 5 questions.*
- *All questions carry equal marks.*

SECTION - A

Section A consists of 25 questions, attempt any 20 questions.

1. The name "Pandas" is derived from the term:
(a) Panel Data (b) Panel Series (c) Python Document (d) Panel Data Frame

2. The command to install the pandas is:
(a) install pip pandas (b) install pandas
(c) pip pandas (d) pip install pandas

3. Python pandas was developed by:
(a) Guido van Rossum (b) Travis Oliphant (c) Wes McKinney (d) Brendan Eich

4. Pandas Series is:
(a) `2 Dimensional` (b) `3 Dimensional`
(c) `1 Dimensional` (d) `Multidimensional`

5. Pandas is a:
(a) Package (b) Language (c) Library (d) Software

6. We can analyse the data in pandas with
(a) Series (b) Data Frame (c) Both of the above (d) None of the above

7. Out of the following, which function cannot be used for customization of charts in Python?
(a) xlabel() (b) colour() (c) title() (d) xticks()

8. What is the minimum number of arguments required for plot() function in matplotlib?
(a) 1 (b) 2 (c) 3 (d) 4

9. Method or function to add a new row in a data frame is:
(a) .loc() (b) .iloc() (c) join (d) add()

10. _____ is the function to save the graph.
(a) Savefig() (b) Savefigure() (c) Savegraph() (d) Savechart()

11. A _____ is a unique data trace of a user's activities, actions, communications or transactions in digital media.
(a) Digital Handprint (b) Digital Footprint
(c) Offline Footprint (d) Offline Handprint

12. Which of the following is not a type of cybercrime?
(a) Data theft (b) Forgery of online documents
(c) Damage to data and systems (d) Installing antivirus for protection

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13. 'F' in FOSS stands for:
(a) Free (b) Forever (c) Fire (d) Freezing

14. Which of the following import statement is not correct?
(a) import pandas as class12 (b) import pandas as 1pd
(c) import pandas as pd1 (d) import pandas as pd

15. IPR stands for:
(a) Intelligent Property Rights (b) Intellectual Property Reserve
(c) Intellectual Property Rights (d) Intellectual Product Rights

16. Which of the following is not a violation of IPR?
(a) Plagiarism (b) Copyright Infringement
(c) Patent (d) Trademark Infringement

17. While accessing the column from the data frame, we can specify the column name. In case column does not exist, which type of error it will raise:
(a) Key Error (b) Syntax Error
(c) Name Error (d) Runtime Error

18. _____is the practice of taking someone else's work or ideas and passing them off as one's own.
(a) Plagiarism (b) Copyright (c) Patent (d) All of the above

19. Function to display the first n rows in the DataFrame:
(a) tail (n) (b) head (n) (c) top (n) (d) first (n)

20. Following are the impact of e-waste on the environment. Choose the odd one out.
(a) Soil Pollution (b) Water Pollution
(c) Air Pollution (d) Sound Pollution

21. Abdul deleted all his chats from all his social media accounts, and he thinks that all his traces are deleted completely. Is he right in thinking so?
(a) Yes (b) No (c) May be (d) Not sure

22. The legal and regulatory aspects of the internet refer to _____.
(a) Cyber Space (b) Cyber crime (c) Criminal law (d) IT act

23. Pandas data frame cannot be created using:
(a) Dictionary of tuples (b) Series
(c) Dictionary of List (d) List of Dictionaries

24. Which function will be used to read data from a CSV file into pandas data frame?
(a) readcsv() (b) to_csv() (c) read_csv() (d) csv_read()

25. Which of the following is not an attribute of pandas data frame?
(a) length (b) T (c) Size (d) shape

SECTION - B

Section B consists of 24 Questions (26 to 49). Attempt any 20 questions.

26. What will be the output of the given code?

```
import pandas as pd
s = pd.Series([1,2,3,4,5],
                    index=['akram','brijesh','charu','deepika','era'])
print(s['charu'])
```

(a) 1 (b) 2 (c) 3 (d) 4

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27. Assuming the given series, named `stud`, which command will be used to print 5 as output?

```
Amit            90
Ramesh          100
Mahesh          50
john            67
Abdul           89
Name: Student, dtype: int64
```

(a) `stud.index` (b) `stud.length`

(c) `stud.values` (d) `stud.size`

28. A social science teacher wants to use a pandas series to teach about Indian historical monuments and its states. The series should have the monument names as values and state names as indexes which are stored in the given lists, as shown in the code. Choose the statement which will create the series:

```
import pandas as pd
Monument=['Qutub Minar','Gateway of India','Red Fort','Taj Mahal']
State=['Delhi','Maharashtra','Delhi','Uttar Pradesh']
```

(a) S=df.Series(Monument,index=State)

(b) S=pd.Series(State,Monument)

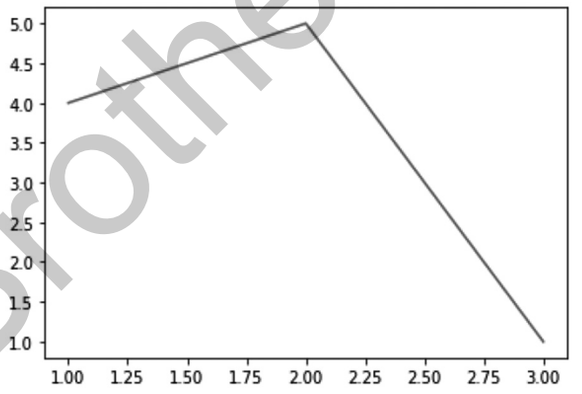
(c) S=pd.Series(Monument,index=State)

(d) S=pd.series(Monument,index=State)

29. _____ is a cybercrime in which a target or targets are contacted by email, telephone or text message by someone posing as a legitimate institution to lure individuals into providing sensitive data such as personally identifiable information, banking and credit card details, and passwords.

(a) Plagiarism (b) Phishing (c) Cyberstalking (d) Hacking

30. Observe the following figure. Identify the coding for obtaining this as output.



(a)
```
import matplotlib.pyplot as plt
plt.plot([1,2],[4,5])
plt.show()
```

(b)
```
import matplotlib.pyplot as plt
plt.plot([1,2,3],[4,5,1])
plt.show()
```

(c)
```
import matplotlib.pyplot as plt
plt.plot([2,3],[5,1])
plt.show()
```

(d)
```
import matplotlib.pyplot as plt
plt.plot([1,3],[4,1])
plt.show()
```

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31. Read the statements given below and identify the right option to draw a histogram.
Statement A: To make a Histogram with Matplotlib, we can use the plt.hist() function.
Statement B: The bin parameter is compulsory to create histogram.
(a) Statement A is correct
(b) Statement B is correct
(c) Statement A is correct, but Statement B is incorrect
(d) Statement A is incorrect, but Statement B is correct

32. Which graph should be used where each column represents a range of values, and the height of a column corresponds to how many values are in that range?
(a) plot (b) line (c) bar (d) histogram

33. Suhhani is confused about the free operating system available in the market. Few of her friends suggested a few operating systems. Help her in choosing free operating system for her device.
(a) Ubuntu (b) Windows (c) Mozilla Firefox (d) Blender

34. Consider the following statements with reference to the use of email:
Statement 1: Sending threatening messages to a classmate.
Statement 2: Inviting friends to participate in a school club or sports activity.
Statement 3: Asking your teacher for help on homework.
Statement 4: Responding to or forwarding spam emails.
Which of the above statements refer to appropriate use of email?
(a) Statements 1 and 2. (b) Statements 2 and 3.
(c) Statements 3 and 4. (d) Statements 2 and 4.

35. Consider the following series named animal:

```
L        Lion
B        Bear
E    Elephant
T       Tiger
W        Wolf
dtype: object
```

Write the output of the command:
print`(animal[::-3])`
(a) L Lion
T Tiger
dtype: object
(b) B Bear
E Elephant
dtype: object
(c) W Wolf
B Bear
dtype: object
(d) W Wolf
T Tiger
dtype: object

36. Saharsh is a student of class -9 and he is a very frequent user of internet applications. One day he got an unpleasant message on his instant messenger. What do you think he should do?
(a) ignore it and start chatting to someone else.
(b) reply back to them and find out what their problem is.
(c) shut down the computer and hope they'll leave him alone in future.
(d) go to his parents, teacher, or other trusted adult and let them know that he feels uncomfortable.

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37. What is a correct syntax to return the values of first row of a Pandas DataFrame? Assuming the name of the DataFrame is dfRent.

(a) dfRent[0] (b) dfRent.loc[1] (c) dfRent.loc[0] (d) dfRent.iloc[1]

38. Feasible method(s) to manage e-waste:

(a) Reduce (b) Reuse (c) Recycle (d) All of the above

39. Difference between loc() and iloc().:

(a) Both are Label indexed based functions.

(b) Both are Integer position-based functions.

(c) loc() is label based function and iloc() integer position based function.

(d) loc() is integer position based function and iloc() index position based function.

40. Write the output of the given program:

```
import pandas as pd
S1=pd.Series([5,6,7,8,10],index=['v','w','x','y','z'])
l=[2,6,1,4,6]
S2=pd.Series(l,index=['z','y','a','w','v'])
print(S1-S2)
```

(a)
```
a   0
v   -1.0
w   2.0
x   NaN
y   2.0
z   8.0
dtype: float64
```

(b)
```
a   NaN
v   -1.0
w   2.0
x   NaN
y   2.0
z   8.0
dtype: float64
```

(c)
```
v   -1.0
w   2.0
y   2.0
z   8.0
dtype: float64
```

(d)
```
a   NaN
v   -1.0
w   2.0
x   3.0
y   2.0
z   8.0
dtype: float64
```

41. We should exhibit proper manners and etiquettes while being online. Choose the right net etiquette(s) from the following:

(a) Avoid Cyber Bullying (b) Respect Other's Privacy

(c) No Copyright violation (d) All of the above

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42. Which command will be used to delete 3 and 5 rows of the data frame. Assuming the data frame name as DF.

(a) DF.drop([2,4],axis=0)
(b) DF.drop([2,4],axis=1)
(c) DF.drop([3,5],axis=1)
(d) DF.drop([3,5])

43. Write the output of the given command:

```
import pandas as pd
s=pd.Series([1,2,3,4,5,6],index=['A','B','C','D','E','F'])
print(s[s%2==0])
```

(a)
```
B    0
D    0
F    0
dtype: int64
```
(b)
```
A    1
B    2
C    5
dtype: int64
```
(c)
```
B    2
D    4
F    6
dtype: int64
```
(d)
```
B    1
D    2
F    3
dtype: int64
```

44. Ritika is a new learner for the python pandas, and she is aware of some concepts of python. She has created some lists, but is unable to create the data frame from the same. Help her by identifying the statement which will create the data frame.

```
import pandas as pd
Name=['Manpreet','Kavil','Manu','Ria']
Phy=[70,60,76,89]
Chem=[30,70,50,65]
```

(a) df=pd.DataFrame({"Name":Name,"Phy":Phy,"Chem":Chem})
(b) d=("Name":Name,"Phy":Phy,"Chem":Chem) df=pd.DataFrame(d)
(c) df=pd.DataFrame([Name,Phy,Chem],columns=['Name',"Phy","Chem","Total"])
(d) df=pd.DataFrame({Name:"Name", Phy :"Phy",Chem: "Chem"})

45. Linux, MySQL and Mozilla Firefox software come under_____ category.

(a) Proprietary
(b) FOSS
(c) Freeware
(d) Shareware

46. Assuming the given structure, which command will give us the given output:

	Flight No	Airline	Passenger
0	1	Indigo	230000
1	2	SpiceJet	12000
2	3	Indian Airlines	240000
3	4	Lufthansa	245000
4	5	Air Asia	210000

Output Required: (3,5)

(a) print(df.shape()
(b) print(df.shape)
(c) print(df.size)
(d) print(df.size())

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47. Write the output of the given command:
df1.loc[:0,'Sal']
Consider the given dataframe.

	EName	Sal	Bonus
0	Kavita	50000	3000
1	Sudha	60000	4000
2	Garima	55000	5000

(a) 0 Kavita 50000 3000
(b) 50000
(c) 3000
(d) 50000

48. Consider the following data frame name df.

	Name	Age	Marks
0	Amit	15	90.0
1	Bhavdeep	16	NaN
2	Reema	17	87.0

Write the output of the given command: print(df.marks/2)

(a)
```
0   45.0
1   NaN
2   43.5
Name: Marks, dtype: float64
```
(b)
```
0   45.0
1   NaN
2   43
Name: Marks, dtype: float64
```
(c)
```
0   45
1   NaN
2   43.5
Name: Marks, dtype: float64
```
(d)
```
0   45.0
1   0
2   43.5
Name: Marks, dtype: float64
```

49. Read the statements given below. Identify the right option from the following for Attribute and method/function.
Statement A: Attribute always ends without parenthesis.
Statement B: Function/Method cannot work without arguments.
(a) Both statements are correct.
(b) Both statements are incorrect.
(c) Statement A is correct, but Statement B is incorrect
(d) Statement A is incorrect, but Statement B is correct

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SECTION - C

Section C consists of 6 Questions (50 to 55). Attempt any 5 questions.

Mr. Sharma is working with an IT company, and he has provided some data. On which he wants to do some operations, but he is facing some problem, help him:

Code:

```
import pandas as pd
ResultSheet={
'Naveen': pd.Series([90, 91, 97],
index=['Maths','Science','Hindi']),
'Rehana': pd.Series([92, 81, 96],
index=['Maths','Science','Hindi']),
'John': pd.Series([89, 91, 88],
index=['Maths','Science','Hindi']),
'Roja': pd.Series([81, 71, 67],
index=['Maths','Science','Hindi']),
'Mannat': pd.Series([94, 95, 99],
index=['Maths','Science','Hindi'])}
DF = pd.DataFrame(ResultSheet)
print(DF)
```

Output of the above code:

	Naveen	Rehana	John	Roja	Mannat
Maths	90	92	89	81	94
Science	91	81	91	71	95
Hindi	97	96	88	67	99

Based on the given information, answer the questions NO. 50-55.

50. He wants to add a new column with name of student 'Prem' in above data frame choose the right command to do so:

(a) DF['Prem']=[89,78,76] (b) df['Prem']=[89,78,76]

(c) DF['Prem']=[89,78,76,67] (d) DF['Name']=[89,78,76]

51. He wants to set all the values to zero in data frame, choose the right command to do so:

(a) DF=0 (b) DF[]=0 (c) DF[:]=0 (d) DF[:]==0

52. He wants to delete the row of science marks:

(a) DF.drop('Science', axis=1) (b) DF.drop('Science', axis=0)

(c) DF.drop('Science', axis=-1) (d) DF.drop('Science', axis==0)

53. The following code is to create another data frame, which he wants to add to the existing Data frame. Choose the right command to do so:

```
Sheet1={
'Aaradhya': pd.Series([90, 91, 97],
   index=['Maths','Science','Hindi'])}
S1=pd.DataFrame(Sheet1)
```

(a) DF.append(S1,axis=0) (b) DF.append(S1)

(c) DF.insert(S1) (d) DF.join(S1)

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54. What will be the output of the given command?

```
DF.index=['A','B','C']
```

(a)

		Naveen	Rehana	John	Roja	Mannat
A	Maths	90	90	89	81	94
B	Science	91	81	91	71	95
C	Hindi	97	96	88	67	99

(b)

	Naveen	Rehana	John	Roja	Mannat
A	90	92	89	81	94
B	91	81	91	71	95
C	97	96	88	67	99

(c)

	A	B	C	Roja	Mannat
Maths	90	92	89	81	94
Science	91	81	91	71	95
Hindi	97	96	88	67	99

(d) Error, Index already exists and cannot be overwritten.

55. What will be the output of the given command?

	Naveen	Rehana	John	Roja	Mannat
Maths	90	92	89	81	94
Science	91	81	91	71	95
Hindi	97	96	88	67	99

```
print(DF.size)
```

(a) 15 (b) 18 (c) 21 (c) 23

ANSWERS

1. (a)	**2.** (d)	**3.** (c)	**4.** (c)	**5.** (c)	**6.** (c)	**7.** (b)	**8.** (a)	**9.** (a)	**10.** (a)
11. (b)	**12.** (d)	**13.** (a)	**14.** (b)	**15.** (c)	**16.** (c)	**17.** (a)	**18.** (a)	**19.** (b)	**20.** (d)
21. (b)	**22.** (d)	**23.** (a)	**24.** (c)	**25.** (a)	**26.** (c)	**27.** (d)	**28.** (c)	**29.** (b)	**30.** (b)
31. (c)	**32.** (d)	**33.** (a)	**34.** (b)	**35.** (c)	**36.** (d)	**37.** (c)	**38.** (d)	**39.** (c)	**40.** (b)
41. (d)	**42.** (a)	**43.** (c)	**44.** (a)	**45.** (b)	**46.** (b)	**47.** (b)	**48.** (a)	**49.** (c)	**50.** (a)
51. (c)	**52.** (b)	**53.** (b)	**54.** (b)	**55.** (a)					

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MODEL TEST PAPER – 1

SECTION : C

(Based on the Latest CBSE Sample Paper)

Time Allowed : 90 Minutes | Maximum Marks : 35

General Instructions :

- *The paper is divided into 3 Sections- A, B and C.*
- *Section A, consists of Question 1 to 25 and student need to attempt 20 questions.*
- *Section B, consists of Question number 26 to 49 and student need to attempt 20 questions.*
- *Section C, consists of Question number 50 to 55 and student need to attempt 5 questions.*
- *All questions carry equal marks.*

SECTION - A

Section A consists of 25 questions, attempt any 20 questions.

1. Python is a:
(a) Hardware (b) Termware
(c) Programming Language (d) Package

2. Pandas is:
(a) open-source library (b) close-source library (c) free-source library (d) none of these

3. Select the correct statement to create empty series.
(a) s=pd.Series() (b) s=pd.series() (c) s=pd[‘Series’] (d) s=pd.Series

4. Pandas Series is one dimensional
(a) Data Frame (b) List (c) Labeled Array (d) Tuple

5. _____method in Pandas can be used to change the index of rows and columns of a Series or Dataframe.
(a) rename() (b) reindex() (c) reframe() (d) none of these

6. Write a single line command to create a series by given list C and index values
`C=['red','green','blue'] , index values=['r','g','b']`
(a) p=pd.Series(C,index=[‘r’,’g’,’b’]) (b) p=pd.Series(list=C,index=[‘r’,’g’,’b’])
(c) p=pd.Series(C]) (d) p=pd.Series(values=C,index=[‘r’,’g’,’b’])

7. Which command is correct to display the plot?
(a) plt.plot() (b) plt.showplot() (c) plt.display() (d) plt.show()

8. The command used to draw a bar graph is
(a) p1.bargraph(x,y) (b) p1.bar(x,y) (c) p1.bgraph(x,y) (d) p1.graphbar(x,y)

9. Method or function to add a new column in a data frame is:
(a) loc() (b) iloc() (c) join() (d) add()

10. What is the minimum number of arguments required for savefig() function in matplotlib?
(a) 1 (b) 2 (c) 3 (d) 4

11. A _____ is data that is left behind when users have been online.
(a) Digital Handprint (b) Digital Footprint (c) Offline Footprint (d) Offline Handprint

12. Posting the your friend’s personal information on social media without taking permission from her is the violation of
(a) Copyright (b) Net Etiquettes (c) Plagiarism (d) None of these

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13. 'F' in ODF stands for:
(a) Free (b) File (c) Fire (d) Format

14. Which of the following import statement is not correct?
(a) import pandas as pd1 (b) import pandas as pdii
(c) import pandas as pd 3 (d) import pandas as PD5

15. 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?
(a) Spamming (b) Phishing (c) Plagiarism (d) Trojan

16. Which of the following is not an intellectual property?
(a) A poem written by a poet (b) An original painting made by a painter
(c) Trademark of a Company (d) A remixed song

17. While adding new column in data frame, if length of new column is bigger than length of index, which type of error it will raise?
(a) Key Error (b) Syntax Error (c) Name Error (d) Value Error

18. Downloading three images from web page and making a collage for his project using these images is an act of _____
(a) Plagiarism (b) Copyright infringement
(c) Intellectual Property Right (d) Digital Footprints

19. Function to display the last n rows in the DataFrame:
(a) tail (n) (b) head (n) (c) top (n) (d) last (n)

20. An organisation purchases new computers every year and dumps 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.
(a) Solid Waste (b) Commercial Waste (c) E-Waste (d) Business Waste

21. Pratibha is an IT expert and a freelancer. She undertakes those jobs, which are related to setting up security software/tools and managing networks in various companies. If we name her role in these companies, what it will be out of the following?
(a) Cracker (b) Network Admin (c) Hacker (d) Operator

22. DataFrame can be created by using
(a) list (b) tuple (c) dictionary (d) all of these

23. From a series P, print[P[-3:]) will display
(a) last 3 records (b) last 2 records (c) 1st 3 records (d) 3rd record from back

24. Which function will be used to write data into CSV file from pandas data frame?
(a) readcsv() (b) to_csv() (c) read_csv() (d) csv_read()

25. Which of the following is not an attribute of pandas data frame?
(a) add (b) index (c) size (d) shape

SECTION - B

Section B consists of 24 Questions (26 to 49). Attempt any 20 questions.

26. What will be the output of the given code?

```
import pandas as pd
data ={'a':0,'b':1.,'c':2.}
s =pd.Series(data,index=['b','c','d','a'])
print(s)
```

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(a) b 0.0
c 1.0
d 2.0
a NaN

(b) b 1.0
c 2.0
d NaN
a 0.0

(c) a 0.0
b 1.0
c 2.0
d NaN

(d) b 1.0
c 2.0
a 0.0

27. Assuming the given series, named stud, which command will be used to print 5 as output?

1 5
2 10
3 15
4 20
5 25

(a) stud.index (b) stud.length (c) stud.values (d) stud.size

28. Given a Pandas dataframe called "S", the command which will display the last 5 rows is

(a) print(S.tail()) (b) print(S.Tail(5)) (c) print(S.tails(5)) (d) print(S.Tails(5))

29. Priyanka is using her internet connection to book a flight ticket. This is a classic example of leaving a trail of web activities carried by her. What do we call this type of activity? What is the risk involved by such kind of activity?

(a) Digital Footprints (b) Web Footprints (c) Internet Footprints (d) Net Footprints

30. Observe the following figure.



Identify the coding for obtaining this as output.

(a)
```
import matplotlib.pyplot as plt
plt.plot([1,2,3,4,5,6],[2,3,4,5,6,7])
plt.show()
```

(b)
```
import matplotlib.pyplot as plt
plt.plot([1,2,3],[4,5,6])
plt.show()
```

(c)
```
import matplotlib.pyplot as plt
plt.plot([2,3,4,5],[1,2,3,4])
plt.show()
```

(d)
```
import matplotlib.pyplot as plt
plt.plot([1:6],[2:7])
plt.show()
```

31. Read the statements given below and identify the right option to draw a Line Graph.

Statement A: To make a Line Graph with Matplotlib, we can use the plt.plot() function.

Statement B: Two parameters are compulsory to create Line Graph.

(a) Both are correct (b) Both are incorrect
(c) Statement A is correct, but Statement B is incorrect
(d) Statement A is incorrect, but Statement B is correct

32. The command used to draw a bar graph is _____.

(a) p1.bargraph(x,y) (b) p1.bar(x,y) (c) p1.bgraph(x,y) (d) p1.graphbar(x,y)

33. Which of the following is not a characteristic of Open Source Software?

(a) Its source code is available for modification (b) It is owned by a company or an individual
(c) It can be downloaded from internet (d) None of these

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34. Consider the following statements with reference to the Net Etiquettes:
Statement 1: Should not use copyrighted materials without the permission of the creator or owner.
Statement 2: Avoid any insulting, degrading or intimidating online behaviour like repeated posting of rumours.
Statement 3: Posting inappropriate jokes on social media
Statement 4: Responding to or forwarding spam emails.
Which of the above statements refer to good Net Ettiquets?
(a) Statements 1 and 2. (b) Statements 2 and 3. (c) Statements 3 and 4. (d) Statements 2 and 4.

35. Consider the following series named Result.

Rohan	90
Aman	60
Divya	34
Jeet	78
Raj	25
Jyoti	85
Gagan	32

Write the output of the command:
print(Result[::-1])
(a) Gagan 32
(b) Gagan 32
Jyoti 85
Raj 25
Jeet 78
Divya 34
Aman 60
Rohan 90
(c) Gagan 32
Raj 25
Divya 34
Rohan 90
(d) No output

36. Aman got a call from bank who was asking his aadhar card number for verification. What do you think he should do?
(a) ignore it and dont tell anything to them.
(b) reply back to them.
(c) shut down the phone and hope they'll leave him alone in future.
(d) go to the cyber police and do register the complaint.

37. What is a correct syntax to return the values of first row of a Pandas DataFrame?
Assuming the name of the DataFrame is df.
(a) df[0] (b) df.loc[1] (c) df.loc[0] (d) df.iloc[1]

38. Feasible method (s) to manage e-waste:
(a) Reduce (b) Reuse (c) Recycle (d) All of these

39. Difference between drop() and del (choose the correct one)
(a) Both operates on columns and rows; (b) del operates on column only.
(c) drop operates on column only. (d) del operates on rows only

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40. Write the output of the given program:

```
import pandas as pd
S=pd.Series([10,20,30,40],index=['a','b','c','d'])
print(S+2)
```

(a)
```
a    12
b    22
c    32
d    42
dtype: int64
```

(b)
```
a+2    12
b+2    22
c+2    32
d+2    42
dtype: int64
```

(c)
```
a+2    10
b+2    20
c+2    30
d+2    40
dtype: int64
```

(d)
```
abcd    102
dtype: int64
```

41. 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:

(a) Business Waste (b) Commercial Waste (c) Solid Waste (d) E-Waste

42. Which command will be used to delete 4 and 6 rows of the data frame. Assuming the data frame name as DF.

(a) DF.drop([3,5],axis=0) (b) DF.drop([3,5],axis=1)

(c) DF.drop([4,6],axis=1) (d) DF.drop([4,6])

43. Write the output of the given command:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],[1,2,3,4,5])
print(s*s)
```

(a)
```
1     100
4     400
6     900
8    1600
10   2500
```

(b)
```
1     100
2     400
3     900
4    1600
5    2500
```

(c)
```
1    10
2    20
3    30
4    40
5    50
```

(d) Error

44. Zeenat has created the following data frame dataframe1 to keep track of data Rollno, Name, Marks1 and Marks2 for various students of her class where row indexes are taken as the default values:

Rollno	Name	Marks1	Marks2
1	Swapnil Sharma	**30**	**50**
2	Raj Batra	**75**	**45**
3	Bhoomi Singh	**82**	**95**
4	Jay Gupta	**90**	**95**

Now she wants to add a new column Marks3 with relevant data. Help her choose the command to perform this task.

(a) dataframe1.column=[45,52,90,95]

(b) dataframe1 ['Marks3']= [45,52,90,95]

(c) dataframe1.loc['Marks3']= [45,52,90,95]

(d) Both (b) and (c) are correct

45. Python software come under _____ category.

(a) Proprietary (b) FOSS (c) Freeware (d) Shareware

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46. Consider the dataframe df

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Choose the correct option to display the 1st record of employee from dataframe df

(i) print(df.iloc[0])
(ii) print(df.loc['A1'])
(iii) print(df.iloc['A1'])
(iv) print(df.loc[0])

(a) only (i)
(b) only (ii)
(c) (i) and (ii)
(d) (iii) and (iv)

47. Consider the following dataframe df

	name	marks
1	Nidhi	95
2	Gurjeet	97
3	Pahul	88
4	Divya	72

Choose the correct statement to change the index values 1 and 2 into 'one' and 'two'

(a) df.rename({1:'one',2:'two'},inplace=True)
(b) df.rename(row={1:'one',2:'two'},inplace=True)
(c) df.rename(index={1:'one',2:'two'},inplace=True)
(d) df.rename({1:'one',2:'two'},axis=1,inplace=True)

48. Consider the following data frame name df

	roll	name	marks
0	1	aman	25
1	2	bhavna	55
2	3	rahul	60

Write the output of the given command:

print(df.marks/2)

(a)
```
0    12.5
1    27.5
2    30.0
```
(b)
```
0    12
1    27
2    30
```
(c)
```
12.5
27.5
30.0
```
(d)

roll	name	marks
0	1 aman	12.5
1	2 bhavna	27.5
2	3 rahul	30

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49. Read the statements given below. Identify the right option from series and dataframe.

Statement A: Python Pandas DataFrame is a heterogeneous two-dimensional object.

Statement B : Python Pandas Series is a heterogeneous one-dimensional object.

(a) Both statements are correct.

(b) Both statements are incorrect.

(c) Statement A is correct, but Statement B is incorrect

(d) Statement A is incorrect, but Statement B is correct

SECTION - C

Section C consists of 6 Questions (50 to 55). Attempt any 5 questions.

Mr. Kapil is working with an IT company, and he has provided some data. On which he wants to do some operations, but he is facing some problem, help him:

Code:

```
import pandas as pd
Data={'Names':['Sanya','Krish','Rishav','Deepak','Kriti',], 'Marks': [95, 70, 96.5, 75, 92],'Trials':[2, 3, 1, 2, 1], 'Passed': ['yes', 'no', 'yes', 'no', 'yes']}
df = pd.DataFrame(Data )
print(df)
```

Output of the above code:

	Names	Marks	Trials	Passed
0	**Sanya**	**95**	**2**	**yes**
1	**Krish**	**30**	**3**	**no**
2	**Rishav**	**96.5**	**1**	**yes**
3	**Deepak**	**75**	**2**	**no**
4	**Kriti**	**92**	**1**	**yes**

Based on the given information, answer the questions NO. 50-55.

50. The code should display the total number of rows in the Dataframe separately as follows:

Number of Rows: 5

(a) print("Number of Rows: ", len(df.axes[0])

(b) print("Number of Rows: ", count(df.axes[0])

(c) print("Number of Rows: ", length(df.axes[0])

(d) print("Number of Rows: ", df.count.index)

51. He wants to change the 'Marks' in the 4th row (i.e. for index 3) to 91.5.

(a) df.iloc[3, 'Marks'] = 91.5

(b) df.change[3, 'Marks'] = 91.5

(c) df[3, 'Marks'] = 91.5

(d) df.loc[3, 'Marks'] = 91.5

52. He wants to display the rows where number of 'Trials' in the examination is less than 2 and 'Marks' is greater than 95.

(a) print(df[(df['Trials'] < 2) && (df['Marks'] > 95)])

(b) print(df[(df['Trials'] < 2) and (df['Marks'] > 95)])

(c) print(df[(df['Trials'] < 2) & (df['Marks'] > 95)])

(d) print(df[(df['Trials'] < 2) or (df['Marks'] > 95)])

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53. He wants to display the information of all failed student.

(a) print(df[df.Passed= ='no'])
(b) print(df.Passed= ='no')
(c) print(df[df.Passed='no'])
(d) print(df.'Passed'= ='no')

54. By mistake he has marked 'no' in passed column of Deepak. He wants to change the passed information of Deepak to 'yes'

(a) df.iloc[3, 'Passed'] = 'yes'
(b) df.loc[3, 'Passed'] = 'yes'
(c) df[3, 'Passed'] = 'yes'
(d) df.loc[3, 3] = 'yes'

55. He wants to display the 'Names' and 'Marks' columns from the DataFrame.

(a) print(df['Names', 'Marks'])
(b) print(df.columns=['Names', 'Marks'])
(c) print(df[['Names', 'Marks']])
(d) print(df.loc['Names', 'Marks'])

ANSWERS

1. (c)	**2.** (a)	**3.** (a)	**4.** (c)	**5.** (b)	**6.** (a)	**7.** (d)	**8.** (b)	**9.** (a)	**10.** (a)
11. (b)	**12.** (b)	**13.** (d)	**14.** (c)	**15.** (c)	**16.** (d)	**17.** (d)	**18.** (a)	**19.** (a)	**20.** (c)
21. (c)	**22.** (d)	**23.** (a)	**24.** (b)	**25.** (a)	**26.** (b)	**27.** (d)	**28.** (a)	**29.** (a)	**30.** (a)
31. (c)	**32.** (b)	**33.** (b)	**34.** (a)	**35.** (b)	**36.** (d)	**37.** (c)	**38.** (d)	**39.** (b)	**40.** (a)
41. (d)	**42.** (a)	**43.** (b)	**44.** (b)	**45.** (b)	**46.** (c)	**47.** (c)	**48.** (a)	**49.** (c)	**50.** (a)
51. (d)	**52.** (c)	**53.** (a)	**54.** (b)	**55.** (c)					

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MODEL TEST PAPER – 2
(Based on the Latest CBSE Sample Paper)

Time Allowed : 90 Minutes | Maximum Marks : 35

General Instructions :

- *The paper is divided into 3 Sections- A, B and C.*
- *Section A, consists of Question 1 to 25 and student need to attempt 20 questions.*
- *Section B, consists of Question number 26 to 49 and student need to attempt 20 questions.*
- *Section C, consists of Question number 50 to 55 and student need to attempt 5 questions.*
- *All questions carry equal marks.*

SECTION - A

Section A consists of 25 questions, attempt any 20 questions.

1. Which of the following is module in python?
(a) pandas (b) matplotlib (c) numpy (d) All of these

2. Python Pandas is used for
(a) Graphic Designing (b) Animaion
(c) Data Manipulation and Analysis (d) All of these

3. Series can be created by using
(a) List (b) Tuple (c) Numpy (d) All of these

4. Series represents a
(a) Single column in memory (b) Double columns in memory
(c) Three columns in memory (d) Multi columns in memory

5. Given a Pandas series called "S", the command which will display the last 4 rows is _____.
(a) print(S.tail(4)) (b) print(S.Tail(4)) (c) print(S.tails(4)) (d) print(S.Tails(4))

6. Size and values of data of Series is
(a) Mutable,Immutable (b) Immutable,Mutable (c) Mutable,Mutable (d) Immutable,Immutable

7. The command used to draw a line graph is
(a) plt.line(x,y) (b) plt.linegraph(x,y) (c) plt. lineplot(x,y) (d) plt. plot(x,y)

8. Which command is correct to set upper left position of legend in line graph?
(a) pos=2 (b) position=2 (c) loc=2 (d) location =2

9. Method or function to add a new column in a data frame is:
(a) iloc() (b) insert() (c) join() (d) add()

10. What is the minimum number of arguments required for bar() function in matplotlib?
(a) 1 (b) 2 (c) 3 (d) 4

11. _____is made when information is collected from the user without the person knowing this is happening.
(a) active footprint (b) passive footprint (c) pass footprint (d) known footprint

12. Repeated posting of rumours online is the violation of
(a) Copyright (b) Cybercrime (c) plagiarism (d) None of these

13. 'O' in ODF stands for:
(a) Original (b) Open (c) Operating (d) Operator

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14. Which of the following statement is correct to create series?
(a) s=Series.pd (b) s=Series(pd) (c) s=pd.Series() (d) pd.Series()=s

15. _____includes sending, posting, or sharing negative, harmful, false, or mean content about someone else.
(a) Cyberbullying. (b) Spamming (c) Phishing (d) Plagiarism

16. A website is a collection of _____
(a) Web Servers (b) Web pages (c) Browsers (d) Hyperlinks

17. If you are deleting a column in dataframe using drop() function but same column name in not there, which type of error it will raise?
(a) Key Error (b) Syntax Error (c) Name Error (d) Value Error

18. Which of the following is suggested while on social media?
(a) Don't save password on other computers/phone (b) Don't share personal information
(c) Don't use abusing language. (d) All of these

19. In a DataFrame, Axis= 0 represents the_____ elements.
(a) row (b) column (c) true (d) false

20. Which of the following method can be used to change the name of column in dataframe?
(a) colname (b) newname (c) rename (d) reindex

21. Which of the following statement is correct to set the value True to ignore_index?
(a) ignore.index:true (b) ignore_index:True (c) ignore_index=True (d) ignore_index=true

22. Which of the following is incorrect statement to create DataFrame using list?
(a) df=pd.DataFrame(data=['red','green','blue','yellow'])
(b) df=pd.DataFrame(list=['red','green','blue','yellow'])
(c) df=pd.DataFrame(['red','green','blue','yellow'])
(d) all of these

23. Which of the following command is used to display all records having rollno>3?
(a) print(df[df['Roll']>3]) (b) print(df['Roll']>3) (c) print(df.Roll>3]) (d) print(df('Roll')>3)

24. Which function will be used to write data into dataframe from CSV file?
(a) readcsv() (b) to_csv() (c) read_csv() (d) csv_read()

25. Which of the following code will display the total number of rows?
(a) print(len(stud.axes[0]) (b) print(stud.len(0)) (c) print(stud.len[axes=0]) (d) print(len(stud.axes[row])

SECTION - B

Section B consists of 24 Questions (26 to 49). Attempt any 20 questions.

26. What will be the output of the given code?

```
import pandas as pd
s =pd.Series(5, index=[0,1,2,3])
print(s)
```

(a)
```
0 5
1 5
2 5
3 5
```
(b)
```
0 1 2 3 5
```
(c)
```
0  0
1  5
2  10
3  15
```
(d)
```
00000
11111
22222
33333
```

27. What will be the output of the given code?

```
import pandas as pd
s=pd.Series([10,20,30,40,50],index =['a','b','c',0,1])
print(s.iloc[1])
```

(a) 10 (b) 20 (c) 40 (d) 50

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28. Write a single line command to calculate 10% from 'sale' column from dataframe df and assign to new column 'Commission'.

(a) df.insert['Commission']=df.sale*10/100

(b) df['Commission']=df.sale*10/100

(c) df.loc['Commission']=df.sale*10/100

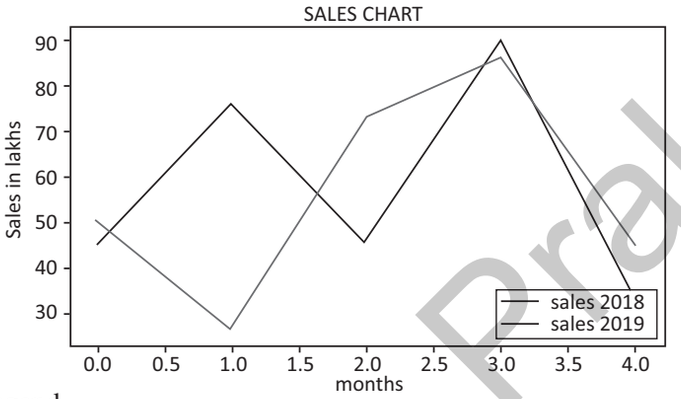
(d) df['Commission',axis=1]=df.sale*10/100

29. _____refers to the proper manners and behaviour we need to exhibit while being online.

(a) Human Etiquets (b) Net Etiquettes

(c) Web Etiquets (d) Online Etiquets

30. Observe the following figure.



Identify the location of legend.

(a) loc=1 (b) loc=2 (c) loc=3 (d) loc=4

31. Read the statements given below and identify the right option while draw a Line Chart.

Statement A: While making line chart, it is compulsory to give legend location.

Statement B: If single list or array is provided to the plot() command, matplotlib assumes it is a sequence of y values.

(a) Both are correct

(b) Both are incorrect

(c) Statement A is correct, but Statement B is incorrect

(d) Statement A is incorrect, but Statement B is correct

32. The command used to draw a bar graph horizontally is _____.

(a) p1.barhor(x,y) (b) p1.hbar(x,y) (c) p1.barh(x,y) (d) p1.graphbarh(x,y)

33. Which of the following not a Open Source software?

(a) Linux (b) MS Windows (c) MySql (d) Python

34. Consider the following statements with reference to the plagiarism.

Which of the following is not considered as plagiarism?

(a) The practice of taking someone else's work or ideas and passing them off as one's own

(b) Copy data from internet

(c) Credit the original author in an in-text citation and reference list.

(d) Using graphs, charts, figures, or images without reference of source

35. Consider the following series named Result.

Rohan	90
Aman	60
Divya	34
Jeet	78
Raj	25

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Jyoti 85
Gagan 32
Write the output of the command:
print(Result[::)

(a) Rohan 90
Aman 60
Divya 34
Jeet 78
Raj 25
Jyoti 85
Gagan 32

(b) Gagan 32
Jyoti 85
Raj 25
Jeet 78
Divya 34
Aman 60
Rohan 90

(c) No output (d) Error

36. Rajiv received a fake email from an unknown person who claimed that Rajiv won Lottery of ₹50 Lacs. They asked Rajiv to provide his personal information for verification. What do you think he should do?
(a) ignore it and dont give any response
(b) reply back to them and share his personal information
(c) delete the mail and hope they'll leave him alone in future.
(d) go to the cyber police and do register the complaint.

37. What is a correct syntax to return the values of last row of a Pandas DataFrame? Assuming the name of the DataFrame is df.
(a) df[-1] (b) df.loc[-1] (c) df.loc[0] (d) df.iloc[0]

38. Python software come under_____ category.
(a) Proprietary (b) FOSS
(c) Freeware (d) Shareware

39. Difference between drop() and del (choose the correct one)
(a) drop can operate on multiple items at a time; del operates only on one at a time.
(b) Both can operate on multiple items at a time.
(c) Both operates only on one at a time
(d) delete can operate on multiple items at a time; drop operates only on one at a time.

40. Write the output of the given program:

```
import pandas as pd
S=pd.Series([10,20,30,40],index=['a','b','c','d'])
print(S-3)
```

(a) a 7
b 17
c 27
d 37
dtype: int64

(b) a-3 7
b-3 17
c-3 27
d-3 37
dtype: int64

(c) a-3 10
b-3 20
c-3 30
d-3 40
dtype: int64

(d) abcd 97
dtype: int64

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41. 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:

(a) Spamming (b) Phishing (c) Plagiarism (d) Trojan

42. Consider the following dataframe df

	year	month	passengers
0	2010	Jan	25
1	2010	Mar	50
2	2012	Jan	35
3	2010	Dec	55
4	2012	Dec	65

Choose the correct statement/method for the required output: (5,3)

(a) df.index (b) df.shape() (c) df.shape (d) df.size

43. Write the output of the given command:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],[1,2,3,4,5])
print(s+s)
```

(a) 1 20
2 40
3 60
4 80
5 100

(b) 2 20
4 40
6 60
8 80
10 100

(c) 2 10
4 20
6 30
8 40
10 50

(d) Error

44. Naman has created the following dataframe "Climate" to record the data about climatic conditions of four years.

Year	MaxTemp	MinTemp	Rainfall
2017	32	20	123
2018	33	22	140
2019	35	21	135
2020	34	23	160

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Which of the following code snippets will return the MaxTemp and Rainfall for year 2018 and 2019?

(a) Climate[['MaxTemp','Rainfall']][1:3]
(b) Climate['MaxTemp', 'Rainfall'][1:3]
(c) Climate.iloc[1:3]
(d) Climate.iloc[1:3,1:2]

45. Photoshop software come under_____ category.

(a) Proprietary (b) FOSS (c) Freeware (d) Shareware

46. Consider the dataframe df

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Display the information of index value A1 and A3 from dataframe df.

(a) print(df.loc['A1','A3'])
(b) print(df.loc[['A1','A3']])
(c) print(df.loc[['A1':'A3']])
(d) print(df['A1','A3'])

47. Consider the following dataframe df

	name	marks
1	Nidhi	95
2	Gurjeet	97
3	Pahul	88
4	Divya	72

Which command will give the given output:
Output Required: 8

(a) print(df.shape()) (b) print(df.shape) (c) print(df.size) (d) print(df.size())

48. Consider the following data frame name df

	roll	name	marks
0	1	aman	25
1	2	bhavna	55
2	3	rahul	60

Write the output of the given command:

```
print(df.marks//2)
```

(a) 0 12.5
1 27.5
2 30.0

(b) 0 12
1 27
2 30

(c) 12.5
27.5
30.0

(d)

	roll	name	marks
0	1	aman	12.5
1	2	bhavna	27.5
2	3	rahul	30

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49. Read the statements given below. Identify the right option from the following for series and dataframe

Statement A: Series is size immutable but value mutable.

Statement B: Dataframe is size and value mutable.

(a) Both statements are correct.

(b) Both statements are incorrect.

(c) Statement A is correct, but Statement B is incorrect

(d) Statement A is incorrect, but Statement B is correct

SECTION - C

Section C consists of 6 Questions (50 to 55). Attempt any 5 questions.

Mr. Ankit is working in an University as data analyst. He uses Python Pandas and Matplotlib for the same. He got a dataset of the students for the year 2010 and 2011. His management wants certain information from him, but he is facing some problems. Help him by answering few questions given below.

CODE

```
import pandas as pd
df1 = pd.DataFrame({'mark1':[30,40,15,40],'mark2':[20,45,30,70]});   #values change
df2 = pd.DataFrame({'mark1':[10,20,20,50],'mark2':[15,25,30,30]});
print(df1)
print(df2)
```

df1

	mark1	mark2
0	10	15
1	40	45
2	15	30
3	40	70

df2

	mark1	mark2
0	30	20
1	20	25
2	20	30
3	50	30

50. He wants to add dataframes df1 and df2.

(i) print(df1+df2))

(ii) print(df1.sum(df2))

(iii) print(df1.append(df2))

(iv) print(df1.add(df2))

(a) Only (i) is correct

(b) Both (ii) and (iii) are correct

(c) Both (iii) and (iv) are correct

(d) Both (i) and (iv) are correct

51. He wants to subtract df2 from df1.

(i) print(df1-df2))

(ii) print(subtract(df1,df2))

(iii) print(df2.minus(df1))

(iv) print(df1.subtract(df2))

(a) Only (i) is correct

(b) Only (iv) is correct

(c) Both (ii) and (iii) are correct

(d) Both (i) and (iv) are correct

52. He wants to rename column mark1 as marks1in dataframe df1.

(a) df1.rename({'mark1':'marks1'}, inplace=True)

(b) df1.rename(columns={'mark1':'marks1'}, inplace=True)

(c) df1.rename(columns{'mark1':'marks1'}, inplace=True)

(d) df1.rename(colnames={'mark1':'marks1'}, inplace=True)

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53. He wants to change index label of df1 from 0 to zero and from 1 to one.

(a) df1.rename(index = {0: "zero", 1:"one"}, inplace = True)

(b) df1.rename(row = {0: "zero", 1:"one"}, inplace = True)

(c) df1.rename(rows = {0: "zero", 1:"one"}, inplace = True)

(d) df1.rename(index{0: "zero", 1:"one"}, inplace = True)

54. He wants to delete column mark2 from dataframe df1.

(a) df1.drop('mark2',axis=0,inplace=True)

(b) df1.del('mark2',axis=1,inplace=True)

(c) del df['marks',axis=1,inplace=True)

(d) df1.drop('mark2',axis=1,inplace=True)

55. Add new column Total in dataframe df2 which is the sum of mark1 and mark2.

(a) df2['Total']=df2.mark1+df2.mark2

(b) df2.column['Total']=df2[mark1+mark2]

(c) df2.add['Total']=df2[mark1+mark2]

(d) df2.newcolumn['Total']=df2[mark1+mark2]

ANSWERS

1. (d)	**2.** (c)	**3.** (d)	**4.** (a)	**5.** (a)	**6.** (b)	**7.** (d)	**8.** (c)	**9.** (b)	**10.** (b)
11. (b)	**12.** (b)	**13.** (b)	**14.** (c)	**15.** (a)	**16.** (b)	**17.** (a)	**18.** (d)	**19.** (a)	**20.** (c)
21. (c)	**22.** (b)	**23.** (a)	**24.** (c)	**25.** (a)	**26.** (a)	**27.** (b)	**28.** (b)	**29.** (b)	**30.** (d)
31. (d)	**32.** (c)	**33.** (b)	**34.** (c)	**35.** (a)	**36.** (d)	**37.** (b)	**38.** (b)	**39.** (a)	**40.** (a)
41. (c)	**42.** (c)	**43.** (a)	**44.** (a)	**45.** (a)	**46.** (b)	**47.** (c)	**48.** (b)	**49.** (a)	**50.** (d)
51. (d)	**52.** (b)	**53.** (a)	**54.** (d)	**55.** (a)					

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MODEL TEST PAPER – 3
(Based on the Latest CBSE Sample Paper)

Time Allowed : 90 Minutes | Maximum Marks : 35

General Instructions :

- *The paper is divided into 3 Sections- A, B and C.*
- *Section A, consists of Question 1 to 25 and student need to attempt 20 questions.*
- *Section B, consists of Question number 26 to 49 and student need to attempt 20 questions.*
- *Section C, consists of Question number 50 to 55 and student need to attempt 5 questions.*
- *All questions carry equal marks.*

SECTION - A

Section A consists of 25 questions, attempt any 20 questions.

1. PANDAS stands for
(a) Panel Data (b) Panel Chart (c) Panel Light (d) Panel Discussion

2. Python pandas was developed in:
(a) 2007 (b) 2008 (c) 2009 (d) 2010

3. Select the correct statement to create empty series.
(a) s=pd.Series() (b) s=pd.series() (c) s=pd['Series'] (d) s=pd.Series

4. Select the correct statement
(a) `import panda as pd` (b) `import pandas as pd`
(c) `import pd as pandas` (d) `import pd as panda`

5. Given a Pandas series called "S", the command which will delete the 1st row(index value 0) _____.
(a) S.delete(0) (b) S.drop(0) (c) S.pop(0) (d) S.del(0)

6. Select code to display the sum of Series M1 and Series M2.
(a) print (sum(M1,M2)) (b) print(M1+M2) (c) print(M1.add(M2)) (d) print(M1.sum(M2))

7. Which of the following is not a valid plotting function of pyplot?
(a) bar() (b) line() (c) hist() (d) plot()

8. In line graph loc=1 is used to set the legend position
(a) upper left (b) upper right (c) lower left (d) lower right

9. Method or function to add a new row in a data frame is:
(a) loc() (b) iloc() (c) join() (d) add()

10. What is the minimum number of arguments required for hist() function in matplotlib?
(a) 1 (b) 2 (c) 3 (d) 4

11. _____footprint is created when you deliberately submit information.
(a) active footprint (b) passive footprint (c) pass footprint (d) known footprint

12. Posting the your friend's personal information on social media without taking permission from her is the violation of
(a) Copyright (b) Cybercrime (c) Plagiarism (d) None of these

13. 'D' in ODF stands for:
(a) Digital (b) Develop (c) Document (d) Dataframe

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14. Which of the following del statement is correct?
(a) del df['Name'] (b) df.del['Name'] (c) del.df['Name'] (d) del df.Name

15. Name the primary law in India dealing with cybercrime and electronic commerce.
(a) Crime law (b) Cyber Law (c) IT Act (d) IT Law

16. The process of getting web pages, images and files from a web server to local computer is called
(a) FTP (b) Uploading (c) Downloading (d) Remote access

17. While creating dataframe if no of index values is not equal to no of rows, which type of error it will raise?
(a) Key Error (b) Syntax Error (c) Name Error (d) Value Error

18. Which of the following can be called as cyber-crime?
(a) Stealing someone's harddisk (b) Harassing somone over internet
(c) Download copyright free songs (d) Sending emails to your friends

19. Write code to delete the row whose index value is A1 from dataframe df.
(a) df=df.drop('A1') (b) df=df.drop(index='A1')
(c) df=df.drop('A1,axis=index') (d) df=df.del('A1')

20. Which of the following method can be used to change the name of index in dataframe?
(a) rowname (b) indexname (c) rename (d) reindex

21. Which statement is incorrect to delete the rows 3 and 4 (index values 2,3) in dataframe df
(a) df=df.drop([2,3],axis=0) (b) df=df.drop(index=[2,3])
(c) df=df.drop([2,3]) (d) df=df.drop(2,3,axis=0)

22. Which of the following statement is correct in order to create DataFrame using list
(a) df=pd.DataFrame(['red','green','blue','yellow'],column=['Colour'])
(b) df=pd.DataFrame(['red','green','blue','yellow'],columns=['Colour'])
(c) df=pd.DataFrame(['red','green','blue','yellow'],colnames=['Colour'])
(d) df=pd.DataFrame(['red','green','blue','yellow'],column['Colour'])

23. Which of the following command is used to add a new column 'Grade', with the values, ' A', 'B', 'A', 'B', 'A' to the DataFrame?
(a) df.column=['A','B','A','B','A']
(b) df ['Grade']=['A','B','A','B','A']
(c) df.insert(loc=3,column='Grade',value= ['A','B','A','B','A'])
(d) Both (b) and (c) are correct

24. CSV file can be opened in
(a) notepad (b) wordpad (c) excel (d) all of these

SECTION - B

Section B consists of 24 Questions (26 to 49). Attempt any 20 questions.

25. Dataframe stud is given below

	roll	**name**	**marks**
S1	1	Nidhi	87
S2	2	Jyoti	45
S3	3	Poonam	67
S4	4	Karambir	39
S5	5	Sangeeta	78

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State the command that will give the output as:

	roll	name
S2	2	Jyoti
S3	3	Poonam

(a) print(stud.iloc[1:2,1:2])
(b) print(stud.iloc[2:3,0:2])
(c) print(stud.iloc[1:3,0:2])
(d) print(stud.iloc[1:3,1:2])

26. What will be the output of the given code?

```
import pandas as pd
name=['Raj','Ankur','Harsh']
p=pd.Series(name,index=[2,5,6])
p1=p.reindex([2,5])
print (p1)
```

(a) 2 Raj
5 Ankur
6 Harsh

(b) 2 Raj
5 Ankur

(c) 2 Raj
5 Harsh

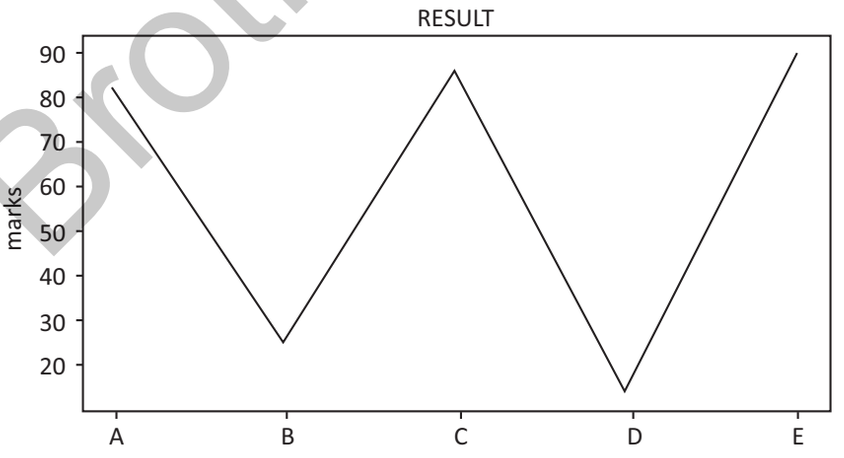
(d) 6 Harsh

27. From the given series, which command will be used to print [5 10 15 20 25] as output?
s=pd.Series([5,10,15,20,25],index=[1,2,3,4,5])
(a) s.index
(b) s.length
(c) s.values
(d) s.size

28. Write the single line command to delete the column "marks" from dataframe df using drop function.
(a) df=df.drop(col='marks')
(b) df=df.drop('marks',axis=col)
(c) df=df.drop('marks',axis=0)
(d) df=df.drop('marks',axis=1)

29. _____is the crime of obtaining the personal or financial information of another person for the sole purpose of assuming that person's name or identity to make transactions or use it to post inappropriate remarks, comments etc.
(a) Plagiarism
(b) Phishing
(c) Identity theft
(d) Cyberstalking

30. Observe the following figure.



Identify the coding for obtaining this as output.

(a)
```
import matplotlib.pyplot as plt
plt.plot([82,25,87,14],['A','B','C','D'])
plt.show()
```

(b)
```
import matplotlib.pyplot as plt
plt.plot([82,25,87,14,90],['A','B','C','D',E'])
plt.show()
```

(c)
```
import matplotlib.pyplot as plt
plt.plot(['A','B','C','D','E'],[82,25,87,14,90])
plt.show()
```

(d)
```
import matplotlib.pyplot as plt
plt.plot([A:E], [82,25,87,14,90])
plt.show()
```

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31. Read the statements given below and identify the right option while drawing a Line Chart.

Statement A: While making line Chart, default value of legend loc is upper left.

Statement B: If x values is missing, matplotlib automatically generates the x values as the same length of y but starts with 1.

(a) Both statements are correct

(b) Both statements are incorrect

(c) Statement A is correct, but Statement B is incorrect

(d) Statement A is incorrect, but Statement B is correct

32. The command used to display the graph is _____

(a) plt.show() (b) plt.plot() (c) plt.display() (d) plt.disp()

33. Which of the following is a Open Source software?

(a) Linux (b) MS Windows (c) Photoshop (d) MS office

34. Consider the following statements with reference to e-waste:

Statement 1: If you don't need a thing, donate it so someone else can use.

Statement 2: Purchase new model of Gadgets even your old one working properly.

Statement 3: Discard your old gadgets which are not working properly.

Statement 4: Try to purchase new equipment those have buy back option.

Which of the above refers to Managing e-Waste?

(a) Statements 1 and 2. (b) Statements 2 and 3.

(c) Statements 3 and 4. (d) Statements 1 and 4.

35. Consider the following series named Result.

```
Rohan   90
Aman    60
Divya   34
Jeet    78
Raj     25
Jyoti   85
Gagan   32
```

Write the output of the command:

```
print(Result[:'Jeet':2])
```

(a)
```
Rohan   90
Divya   34
Jeet    78
```

(b)
```
Aman   60
Jeet   78
```

(c)
```
Rohan   90
Divya   34
```

(d)
```
Rohan   90
Aman    60
Divya   34
Jeet    78
```

36. Rohit is a student of class 12th and he is a very frequent user of internet applications. One day he comes to know that someone is using his email and sending unpleasant messages to other person on his behalf. What do you think he should do?

(a) ignore it and dont tell anything to anyone

(b) stop using own emial id

(c) talk to him and hope he will not do such kind of things in future

(d) go to his parents, teacher, or other trusted adult and let them know that he feels uncomfortable

37. What is a correct syntax to return the values of last two row of a Pandas DataFrame? Assuming the name of the DataFrame is df.

(a) df[-1:] (b) df.loc[-2]

(c) df.loc[:-2] (d) df.iloc[-2:]

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38. Photoshop software come under_____ category.

(a) Proprietary (b) FOSS

(c) Freeware (d) Shareware

39. Difference between drop() and del (choose the correct one)

(a) both operates in-place or return a copy;

(b) del can operate in-place or return a copy; drop is an in-place operation only

(c) drop can operate in-place or return a copy; del is an in-place operation only

(d) both operates in-place operation only

40. Given the following two series P1 and P2

P1		P2	
A	10	A	100
B	20	B	200
C	30	C	300
D	40	D	400
E	50	E	500

Give the output of following command.

```
print(P1+P2)
```

(a)
2A 110
2B 220
2C 330
2D 440
2E 550

(b)
A 110
B 220
C 330
D 440
E 550

(c)
A 10+A 100
B 20+B 200
C 30+C 300
D 40+D 400
E 50+E 500

(d) None of these

41. Which of the following is not an intellectual property?

(a) A poem written by a poet

(b) An original painting made by a painter

(c) Trademark of a Company

(d) Programe Developed by computer science student

42. Consider the following dataframe df

	year	month	passengers
0	2010	Jan	25
1	2010	Mar	50
2	2012	Jan	35
3	2010	Dec	55
4	2012	Dec	65

Choose the correct statement/method to print the details of "January" month along with the number of passengers.

	month	passengers
0	Jan	25
2	Jan	35

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(a) df.loc[['Month','Passengers']][df['Month']=='Jan']

(b) df[['Month','Passengers']][df['Month']=='Jan']

(c) df.iloc[['Month','Passengers']][df['Month']=='Jan']

(d) df(['Month','Passengers']][df['Month']=='Jan')

43. Write the output of the given command:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],[1,2,3,4,5])
print(s[::2])
```

(a) 3 30

(b) 2 20

(c) 1 10
3 30

(d) 1 10
3 30
5 50

44. HR Department of ABCTech has created following dataframe df to store data about salaries and bonus paid to their employees:

	EName	Sal	Bonus
0	Kavita	50000	3000
1	Sudha	60000	4000
2	Garima	55000	5000

Choose the python statement to display the columns Sal and Bonus

(a) df1 [:Sal :Bonus]

(b) df1.loc(['Sal','Bonus'])

(c) df1.iloc(['Sal','Bonus'])

(d) df1[['Sal','Bonus']]

45. MS Office software come under_____ category.

(a) Proprietary

(b) FOSS

(c) Freeware

(d) Shareware

46. Consider the dataframe df

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Choose the correct option to display name and salary of all employees from dataframe df.

(a) print(df.loc[:,['name','salary']])

(b) print(df.loc[['name','salary']])

(c) print(df.iloc[:,[1,2]])

(d) all of the above

47. Consider the following dataframe df

	name	marks
1	Nidhi	95
2	Gurjeet	97
3	Pahul	88
4	Divya	72

Which command will give us the given output:

Output Required: (4,2)

(a) print(df.shape())

(b) print(df.shape)

(c) print(df.dimension)

(d) print(df.length)

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48. Consider the following data frame name df

	roll	name	marks
0	1	aman	25
1	2	bhavna	55
2	3	rahul	60

Write the output of the given command:

```
print(df.marks*2)
```

(a)
0	50
1	110
2	120

(b)
	50
	110
	120

(c) (50,110,120)

(d)
	roll	name	marks
0	1	aman	50
1	2	bhavna	110
2	3	rahul	120

49. Read the statements given below. Identify the right option from the following for graphs.

Statement A: Minimum two parameters are required for both plot() and bar() graph

Statement B: The default position of legend is 1 (loc=1)

(a) Both statements are correct.

(b) Both statements are incorrect.

(c) Statement A is correct, but Statement B is incorrect

(d) Statement A is incorrect, but Statement B is correct

SECTION - C

Section C consists of 6 Questions (50 to 55). Attempt any 5 questions.

Naman has created the following dataframe "Climate" to record the data about climatic conditions of four years.

Year	MaxTemp	MinTemp	Rainfall
2017	32	20	123
2018	33	22	140
2019	35	21	135
2020	34	23	160

50. Which of the following code snippets will return the MaxTemp and Rainfall for year 2018 and 2019?

(a) Climate[['MaxTemp','Rainfall']][1:3]

(b) Climate['MaxTemp', 'Rainfall'][1:3]

(c) Climate.iloc[1:3]

(d) Climate.iloc[1:3,1:2]

51. Display the temperature difference between MaxTemp and MinTemp for all the rows in the dataframe Climate.

(a) `Climate=Climate["MaxTemp"]-Climate["MinTemp"]`

(b) `print(Climate["maxt"]-Climate["mint"])`

(c) `print(Climate["MaxTemp"]-Climate["MinTemp"])`

(d) `print(Climate.Climate["MaxTemp"]-Climate["MinTemp"])`

52. To display 2 rows from the top in the dataframe, which of the following statement is correct?

(a) print (Climate.head()=2)

(b) print (Climate.head(n==2))

(c) print (Climate.head(range(2)))

(d) print (Climate.head(2))

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53. Which of the following statement/s will give the exact number of values in each column of the dataframe?

(A) print(Climate.count())
(B) print(Climate.count(0))
(C) print(Climate.count)
(D) print(Climate.count(axis='index'))

Choose the correct option:

(a) both (A) and (B)
(b) only (B)
(c) (A), (B) and (C)
(d) (A), (B) and (D)

54. To display 2 rows from the bottom in the dataframe, which of the following statement is correct:

(a) print (Climate.tail()=2)
(b) print (Climate.tail(n==2))
(c) print(Climate.tail(range(2)))
(d) print (Climate.tail(2))

55. Display the details of 2019 year.

(a) Climate[2]
(b) Climate.loc[2]
(c) Climate.iloc[2]
(d) Both (b) and (c)

ANSWERS

1. (a)	**2.** (b)	**3.** (a)	**4.** (b)	**5.** (b)	**6.** (b)	**7.** (b)	**8.** (b)	**9.** (a)	**10.** (a)
11. (a)	**12.** (b)	**13.** (c)	**14.** (a)	**15.** (c)	**16.** (c)	**17.** (d)	**18.** (b)	**19.** (a)	**20.** (c)
21. (d)	**22.** (b)	**23.** (d)	**24.** (d)	**25.** (c)	**26.** (b)	**27.** (c)	**28.** (d)	**29.** (c)	**30.** (c)
31. (b)	**32.** (a)	**33.** (a)	**34.** (d)	**35.** (c)	**36.** (d)	**37.** (d)	**38.** (a)	**39.** (c)	**40.** (b)
41. (d)	**42.** (b)	**43.** (d)	**44.** (d)	**45.** (a)	**46.** (d)	**47.** (b)	**48.** (a)	**49.** (b)	**50.** (a)
51. (c)	**52.** (d)	**53.** (d)	**54.** (d)	**55.** (d)					

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MODEL TEST PAPER – 4

(Based on the Latest CBSE Sample Paper)

Time Allowed : 90 Minutes | Maximum Marks : 35

General Instructions :

- *The paper is divided into 3 Sections- A, B and C.*
- *Section A, consists of Question 1 to 25 and student need to attempt 20 questions.*
- *Section B, consists of Question number 26 to 49 and student need to attempt 20 questions.*
- *Section C, consists of Question number 50 to 55 and student need to attempt 5 questions.*
- *All questions carry equal marks.*

SECTION - A

Section A consists of 25 questions, attempt any 20 questions.

1. Which of the following is module in python?
(a) pandas (b) dataFrame (c) series (d) All of these

2. Python pandas was developed in:
(a) 1998 (b) 2008 (c) 2018 (d) None of these

3. Series can be created by using
(a) Numpy (b) Dictionary
(c) Scalar Value (d) All of these

4.
```
data ={'a':10.,'b':11.,'c':12.}
s =pd.Series(data)
index values of s is _____
```
(a) 0,1,2 (b) 10,11,12 (c) a,b,c (d) 10a,11b,12c

5. Given a Pandas series called Sequences, the command which will display the first 4 rows is _____.
(a) print(Sequences.head(4)) (b) print(Sequences.Head(4))
(c) print(Sequences.heads(4) (d) print(Sequences.Heads(4))

6. Select code to show rows where values of series M1 greater than 75.
(a) print(M1>75) (b) (print(M1[M1>75])
(c) print(M1>'75') (d) print(M1(M1>75))

7. The command used to draw a line graph is
(a) line() (b) chart() (c) linechart() (d) plot()

8. In line graph loc=2 is used to set the legend position.
(a) upper left (b) upper right (c) lower left (d) lower right

9. Method or function to add a new row in a data frame is:
(a) append() (b) iloc() (c) join() (d) add()

10. What is the minimum number of arguments required for legend() function in matplotlib?
(a) 0 (b) 1 (c) 2 (d) 3

11. Download images from internet and paste in your project is the violation of _____.
(a) net etiquettes (b) plagiarism (c) copyright (d) none of these

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12. _____ is a term used to describe the legal issues related to use of communications technology, particularly "cyberspace", i.e. the Internet.
(a) Cyber law (b) Net law (c) Online law (d) Network law

13. 'O' in OSS stands for:
(a) Original (b) Open (c) Operating (d) Operator

14. Which of the following plot statement is not correct?
(a) p.plot(x,y) (b) p.plot(y,x) (c) p.plot(y) (d) p.plot()

15. Hackers are known as
(a) White hats (b) Black hats (c) Red hats (d) Blue hats

16. BOSS is open source _____
(a) Operating System (b) Browser (c) Software (d) None of these

17. This shape attribute returns the number of rows and number of columns available in dataframe in form of
(a) tuple (b) list (c) dictionary (d) string

18. A _____ is a type of intellectual property that gives its owner the legal right to exclude others from making, using, or selling an invention for a limited period of years.
(a) Trademark (b) Patent (c) Copyright holder (d) Plagiarism

19. Write code to delete rows those getting 5000 salary.
(a) df=df.drop[salary==5000] (b) df=df[df.salary!=5000]
(c) df.drop[df.salary==5000,axis=0] (d) df=df.drop[salary!=5000]

20. Which of the following attribute can be used to change the name of column in dataframe?
(a) colname (b) newname (c) column (d) reindex

21. How to set value of axis to 1 while renaming any column name?
(a) axis:1 (b) axis(1) (c) axis=1 (d) axis[1]

22. If Dictionary keys name is not same the dataframe columns name then it will display ____ values in dataframe column.
(a) 0 (b) NaN (c) blank (d) error message

23. Which of the following command is used to delete the column "Name"?
(a) del df["Name"] (b) df=df.drop('name',axis=1)
(c) df=df.drop('name',axis=0) (d) Both (a) and (b) are correct

24. When Saving csv to any other directory the _____ character should be placed before the path name.
(a) c (b) s (c) v (d) r

25. Which of the following is used to add new row with following data with index value 'S6':
6,'Divya',92
(a) stud['S6']=[6,'Divya',92] (b) stud.iloc['S6']=[6,'Divya',92]
(c) stud..row['S6']=[6,'Divya',92] (d) stud.loc['S6']=[6,'Divya',92]

SECTION - B

Section B consists of 24 Questions (26 to 49). Attempt any 20 questions.

26. What will be the output of the given code?

```
import pandas as pd
name=['Raj','Ankur','Harsh']
p=pd.Series(name,index=[2,5,6])
```

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```
p1=p.reindex([2,4,5])
print (p1)
```

(a)
2	Raj
5	Ankur
6	Harsh

(b)
2	Raj
4	NaN
5	Ankur
6	Harsh

(c)
2	Raj
4	NaN
5	Ankur

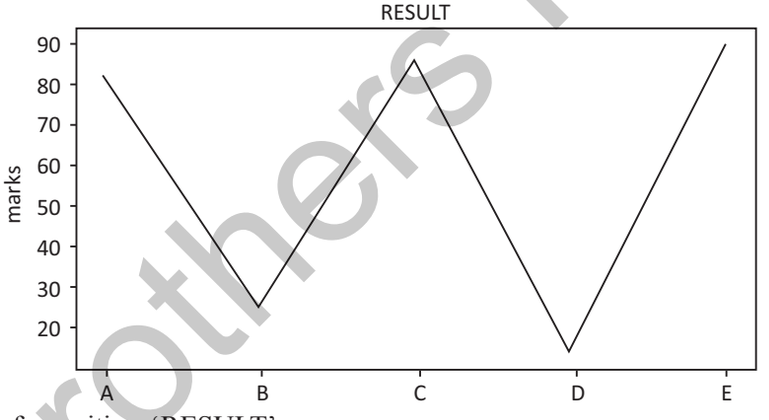
(d)
2	Raj
4	Ankur
5	Harsh

27. Which attribute is used to returns the data type of the underlying data for the given Series object?
(a) s.dtype (b) s.type (c) s.datatype (d) s.size

28. Which one is incorrect option to add a new column using insert() in the last place(3rd place) named "Salary" from the list Sal=[10000,15000,20000] in an existing dataframe named EMP already having 2 columns?
(a) EMP.insert(loc=2,column="Salary",value=Sal)
(b) EMP.insert(2,"Salary",Sal)
(c) EMP.insert(loc=2,column="Salary",value=[10000,15000,20000])
(d) EMP.insert(loc=2,col="Salary",value=Sal)

29. Alex likes to do his homework late at night. He uses the Internet a lot and also sends useful data through email to many of his friends. One Day he forgot to sign out from his email account. In the morning, his twin brother, Flex started using the computer. He used Flex's email account to send inappropriate messages to his contacts. Such type of activity is called _____?
(a) Plagiarism (b) Phishing (c) Identity theft (d) Cyberstalking

30. Observe the following figure.



Identify the statement for writing 'RESULT'.
(a) p1.head("RESULT") (b) p1.heading("RESULT")
(c) p1.top("RESULT") (d) p1.title("RESULT")

31. Read the statements given below and identify the right option while draw a Line Chart.
Statement A: While making line chart, legend can be placed at any location.
Statement B: It is complusory to provide xlabel and ylabel values.
(a) Statement A, B both are correct
(b) Statement A, B both are incorrect
(c) Statement A is correct, but Statement B is incorrect
(d) Statement A is incorrect, but Statement B is correct

32. The command used to set the label of x axis is _____
(a) plt.xaxis() (b) plt.labelx() (c) plt.xtitle() (d) plt.xlabel()

33. Poonam is confused about the free operating system available in the market. Few of her friends suggested a few operating systems. Help her in choosing free operating system for her device.
(a) Linux (b) Opera (c) Mozilla Firefox (d) Google Chrome

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34. Consider the following statements with reference to cyber crime:

(i) Stealing brand new hard disk from a shop.

(ii) Getting into unknown person's social networking account and start messaging on his behalf.

(iii) Copying some important data from a computer without taking permission from the owner of the data.

(iv) Looking at online activities of a friends blog.

Which out of the following comes under Cyber Crime?

(a) Statements 1 and 2. (b) Statements 2 and 3. (c) Statements 3 and 4. (d) Statements 2 and 4.

35. Consider the following series named Result.

Rohan	90
Aman	60
Divya	34
Jeet	78
Raj	25
Jyoti	85
Gagan	32

Write the output of the command:

```
print(Result[-1:-5:-1])
```

(a) No output

(b)

Gagan	32
Jyoti	85
Raj	25
Jeet	78

(c)

Aman	60
Divya	34
Jeet	78
Raj	25

(d)

Gagan	32
Jyoti	85
Raj	25
Jeet	78
Divya	34

36. The school offers Wi-Fi to the students of Class XII, emails were received by all the students regarding expiry of their passwords. Instructions were also given renew their password within 24 hours by clicking on particular URL provided. What do you think they should do?

(a) ignore it and dont tell anything to anyone

(b) stop using their emial id

(c) click on link for renew their password

(d) talk to their parents, teacher, or other trusted adult and let them know about the situation

37. From the following dataframe df, calculate the sum of sal and bonue of 1st row (index value 0) using iloc

	EName	Sal	Bonus
0	Kavita	50000	3000
1	Sudha	60000	4000
2	Garima	55000	5000

(a) print(df.iloc[0,1]+df.iloc[0,2])

(b) print(df.iloc[1,0]+df.iloc[0,2])

(c) print(df.iloc[0,1]+df.iloc[1,2])

(d) print(df.iloc[0,1]+df.iloc[0,1])

38. MS Office software come under_____ category.

(a) Proprietary (b) FOSS (c) Freeware (d) Shareware

39. Choose the correct one about Series and DataFrame

(a) Both are one dimensional

(b) Both are two dimensional

(c) Series is one dimensional whereas a DataFrame is two dimensional.

(d) Data Frame is one dimensional whereas a Series is two dimensional.

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40. Given the following two series P1 and P2

P1		P2	
A	10	A	100
B	20	B	200
C	30	C	300
D	40	D	400
E	50	E	500

Give the output of following command.
print(P1-P2)

(a) A 90
B 180
C 270
D 360
E 450

(b) A -90
B -180
C -270
D -360
E -450

(c) A 10-A 100
B 20-B 200
C 30-C 300
D 40-D 400
E 50-E 500

(d) -90
-180
-270
-360
-450

41. Open Office software come under_____ category.
(a) Proprietary
(b) FOSS
(c) Freeware
(d) Shareware

42. Consider the following dataframe df

	year	month	passengers
0	2010	Jan	25
1	2010	Mar	50
2	2012	Jan	35
3	2010	Dec	55
4	2012	Dec	65

Choose the correct statement/method to change the index of the Data Frame and the output for the same is given below.

	year	month	passengers
AirIndia	2010	Jan	25
Indigo	2010	Mar	50
Spicejet	2012	Jan	35
Jet	2010	Dec	55
Emirates	2012	Dec	65

(a) df.index[]=[“Air India”,”Indigo”,”Spicejet”,”Jet”,”Emirates”]
(b) df.index[“Air India”,”Indigo”,”Spicejet”,”Jet”,”Emirates”]
(c) df.index=[“Air India”,”Indigo”,”Spicejet”,”Jet”,”Emirates”]
(d) df.index()=[“Air India”,”Indigo”,”Spicejet”,”Jet”,”Emirates”]

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43. Write the output of the given command:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],[1,2,3,4,5])
print(s[:2])
```

(a) 1 10
2 20

(b) 2 20

(c) 1 10

(d) 1 10
2 20
3 30

44. Consider the following dataframe Climate

Year	MaxTemp	MinTemp	Rainfall
2017	32	20	123
2018	33	22	140
2019	35	21	135
2020	34	23	160

To display 2 rows from the top in the dataframe, which of the following statement is correct?

(a) print (Climate.head()=2)
(b) print (Climate.head(n==2))
(c) print (Climate.head(range(2)))
(d) print (Climate.head(2))

45. A student is expected to write a research paper on a topic. The student had a friend who took a similar class five years ago. The student asks his older friend for a copy of his paper and then takes the paper and then submits the entire paper as his own research work.

Which of the following activities appropriately categorises the act of the writer:

(a) Plagiarism (b) Spamming (c) Virus (d) Phishing

46. Consider the dataframe df

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Choose the correct option to display name and salary of A1 and A2 from dataframe df.

(i) print(df.loc[[‘A1’,’A2’],[‘name’,’salary’]])
(ii) print(df.loc[‘A1’:’A2’,[‘name’,’salary’]])
(iii) print(df[[‘A1’,’A2’],[‘name’,’salary’]])
(iv) print(df.iloc[[0,1],[‘name’,’salary’]])

(a) (i) and (iii) (b) (i) and (ii) (c) (iii) and (iv) (d) (i) and (iv)

47. Consider the dataframe “EMP”

	Name	Basic	Da	Hra
E1	Sanya	9500	3000	2000
E2	Krish	7000	5000	1900
E3	Rishav	9650	1500	2100
E4	Deepak	7500	2000	2700
E5	Kriti	9200	1800	500

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Choose command to Change the Da of Krish to 8000

(i) EMP.iloc[1,2]=8000 (ii) EMP.iloc['E2','Da']=8000

(iii) EMP.loc[1,2]=8000 (iv) EMP.loc['E2','Da']=8000

(a) only i (b) i and ii (c) iii and iv (d) i and iv

48. Consider the following data frame name df

	roll	name	marks
0	1	aman	25.0
1	2	bhavna	NaN
2	3	rahul	60.0

Write the output of the given command:

```
print(df.size)
```

(a) 6 (b) 7 (c) 8 (d) 9

49. Read the statements given below. Identify the right option from the following for insert function in dataframe.

Statement A: insert() can be used to add new column at any position in dataframe.

Statement B: pos is a parameter of insert() to set the location of new column.

(a) Both statements are correct.

(b) Both statements are incorrect.

(c) Statement A is correct, but Statement B is incorrect

(d) Statement A is incorrect, but Statement B is correct

SECTION - C

Section C consists of 6 Questions (50 to 55). Attempt any 5 questions.

Mr. Karambir is working as Examinor In-Charge in school, and he has provided some data. On which he wants to do some operations, but he is facing some problem, help him:

	Roll	Name	marks
0	1	a	87
1	2	b	45
2	3	c	67
3	4	d	39
4	5	e	78

50. Which of the following command is used to display all records having rollno>3?

(a) print(df[df['Roll']>3]) (b) print(df['Roll']>3)

(c) print(df.Roll>3]) (d) print(df('Roll')>3)

51. Which of the following command is used to add a new column 'Grade', with the values, ' A', 'B', 'A', 'B', 'A' to the DataFrame?

(a) df.column=['A','B','A','B','A']

(b) df ['Grade']=['A','B','A','B','A']

(c) df.insert(loc=3,column='Grade',value= ['A','B','A','B','A'])

(d) Both (b) and (c) are correct

52. Which of the following command is used to delete the column "Name"?

(a) del df["Name"]

(b) df=df.drop('name',axis=1)

(c) df=df.drop('name',axis=0)

(d) Both (a) and (b) are correct

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53. Which of the following command is used to rename the column "Marks" to "Tmarks" in the existing dataframe df?

(a) df.rename(columns={'Marks': 'TMarks'},inplace=True)

(b) df.rename(columns={'Marks': 'TMarks'})

(c) df.rename({"Marks":"TMarks"},axis=0)

(d) both (a) and (c) are correct

54. He wants to add new rows with data [6,'f',90].

(a) df.iloc[5]=[6,'f',90]

(b) df[5]={6,'f',90}

(c) df[5]=[6,'f',90]

(d) df.loc[5]=[6,'f',90]

55. Give the output

```
print(len(df.axes[0]))
```

(a) 4 (b) 5 (c) 6 (d) 7

ANSWERS

1. (a)	**2.** (b)	**3.** (d)	**4.** (c)	**5.** (a)	**6.** (b)	**7.** (d)	**8.** (a)	**9.** (a)	**10.** (a)
11. (b)	**12.** (a)	**13.** (b)	**14.** (d)	**15.** (a)	**16.** (a)	**17.** (a)	**18.** (b)	**19.** (b)	**20.** (c)
21. (c)	**22.** (b)	**23.** (d)	**24.** (d)	**25.** (d)	**26.** (c)	**27.** (a)	**28.** (d)	**29.** (c)	**30.** (d)
31. (b)	**32.** (d)	**33.** (a)	**34.** (b)	**35.** (b)	**36.** (d)	**37.** (a)	**38.** (a)	**39.** (c)	**40.** (b)
41. (b)	**42.** (c)	**43.** (a)	**44.** (d)	**45.** (a)	**46.** (b)	**47.** (c)	**48.** (d)	**49.** (c)	**50.** (a)
51. (d)	**52.** (d)	**53.** (a)	**54.** (d)	**55.** (b)					

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MODEL TEST PAPER – 5
(Based on the Latest CBSE Sample Paper)

Time Allowed : 90 Minutes | Maximum Marks : 35

General Instructions :

- *The paper is divided into 3 Sections- A, B and C.*
- *Section A, consists of Question 1 to 25 and student need to attempt 20 questions.*
- *Section B, consists of Question number 26 to 49 and student need to attempt 20 questions.*
- *Section C, consists of Question number 50 to 55 and student need to attempt 5 questions.*
- *All questions carry equal marks.*

SECTION - A

Section A consists of 25 questions, attempt any 20 questions.

1. Which of the following is module in python?
(a) pandas (b) bar (c) line (d) All of these

2. Python Pandas is used for:
(a) Data Gathering (b) Data Storage
(c) Data Manipulation and Analysis (d) All of these

3. Which is not the part of parameter of Series()?
(a) index (b) columns (c) dtype (d) none of these

4. Pandas Series is a _____:
(a) one-dimensional labeled array (b) two-dimensional labeled array
(c) three-dimensional labeled array (d) multi-dimensional labeled array

5. Command to create empty Series is _____.
(a) s=pd.emptySeries() (b) s=pd.Series(empty)
(c) s=pd.Series() (d) s=pd.Series(NaN)

6. Set the series name "Marks1" of M1 series.
(a) M1.seriesname="Marks1" (b) M1.name="Marks1"
(c) M1.newname="Marks1" (d) M1.setname="Marks1"

7. By default color of one line graph is _____.
(a) Red (b) Green (c) Blue (d) Yellow

8. In line graph loc=3 is used to set the legend position _____.
(a) upper left (b) upper right (c) lower left (d) lower right

9. This attribute is used to fetch the index's names from dataframe:
(a) indexname (b) index.name
(c) index (d) name.index

10. What is the default loc value of legend() function?
(a) 0 (b) 1 (c) 2 (d) 3

11. Download music from internet and use it in your youtube video is the violation of _____.
(a) net etiquettes (b) plagiarism
(c) copyright (d) None of these

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12. Which of the following crime(s) is/are covered under cybercrime?

(i) Stealing brand new hard disk from a shop.

(ii) Getting into unknown person's social networking account and start messaging on his behalf.

(iii) Copying some important data from a computer without taking permission from the owner of the data.

(iv) Working on someone's computer with his/her permission.

(a) only (ii) (b) (ii) and (iv) (c) (ii) and (iii) (d) (iii) and (iv)

13. First 'S' in OSS stands for:

(a) Simple (b) Signature (c) Source (d) Software

14. Which of the following statement is not correct to create series?

(a) s=pd.Series(data=[10,20,30],index=['a','b','c']) (b) s=pd.Series([10,20,30],index=['a','b','c'])

(c) s=pd.Series([10,20,30],['a','b','c']) (d) s=pd.Series(data=[10,20,30],['a','b','c'])

15. They are the programmers or computer experts with adequate knowledge of programming and coding who find the loopholes present in a system and try to cover them and hence protect the system.

(a) Hackers (b) Crackers (c) Operators (d) Admin

16. The open source indian operating system is _____

(a) Linux (b) Android (c) BOSS (d) Ubuntu

17. Empty attribute in dataframe gives _____ output in the form of true or false.

(a) tuple (b) string (c) boolean (d) list

18. A _____ is a type of intellectual property consisting of a symbol, word, or words legally registered or established by use as representing a company or product.

(a) Trademark (b) Patent

(c) Copyright holder (d) Plagiarism

19. Write the command to display Pid,Price from an existing dataframe named PRODUCT having 4 columns =[Pid, Pname,Price,Qty]?

(a) print (PRODUCT[['Pid','Price']]) (b) print (PRODUCT[col=['Pid','Price']])

(c) print (PRODUCT['Pid','Price']) (d) print (PRODUCT['Pid','Price'],axis=1)

20. Which of the following attribute can be used to change the name of index values in dataframe?

(a) indexname (b) newindex (c) index (d) reindex

21. Select correct option to show name of all rows in dataframe df.

(a) print(df.axes=0) (b) print(df(axes=0))

(c) print(df.axes[0]) (d) print(df[axes=0])

22. Which of the following is not the attribute of dataframe?

(a) rows (b) columns (c) axes (d) dtype

23. Which of the following command is used to rename the column "Marks" to "Tmarks" in the existing dataframe df?

(a) df.rename(columns={'Marks': 'TMarks'},inplace=True)

(b) df.rename(columns={'Marks': 'TMarks'})

(c) df.rename({"Marks":"TMarks"},axis=0)

(d) both (a) and (c) are correct

24. Choose the correct statement delete the column name from datafram df using drop function, changes should take effect in existing dataframe.

(a) df.drop('name',0,inplace=True) (b) df.drop('name',1)

(c) df.drop('name',axis=0,inplace=True) (d) df.drop('name',1,inplace=True)

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25. Choose the correct option to add new column Gender at position 2 (index value 1) to dataframe stud with values ['F','F','F','M','F']

(A) stud.insert(1,'Gender',['F','F','F','M','F'])

(B) stud.insert(loc=1,column='Gender',value=['F','F','F','M','F'])

(C) stud.insert(loc=1,field='Gender',values=['F','F','F','M','F'])

(D) stud.insert(loc=1,column='Gender',values=['F','F','F','M','F'])

(a) Only A is correct (b) A and B are correct

(c) B and C are corect (d) A and D are correct

SECTION - B

Section B consists of 24 Questions (26 to 49). Attempt any 20 questions.

26. Which command is correct to change the index value in series S?

(a) S.reindex = [1, 2, 3, 4, 5] (b) S.newindex = [1, 2, 3, 4, 5]

(c) S[index]= [1, 2, 3, 4, 5] (d) S.index = [1, 2, 3, 4, 5]

27. Which option is not correct to get the following output from the given series s?

s=pd.Series([10,20,30,40,50])

output

```
0   10
1   20
2   30
```

(a) print(s.iloc[0:3]) (b) print(s.loc[0:3])

(c) print(s[0:3]) (d) print(s.head(3))

28. Write a small python code to drop a column "address" from dataframe stud using del.

(a) del stud[col="address"] (b) del stud[column="address"]

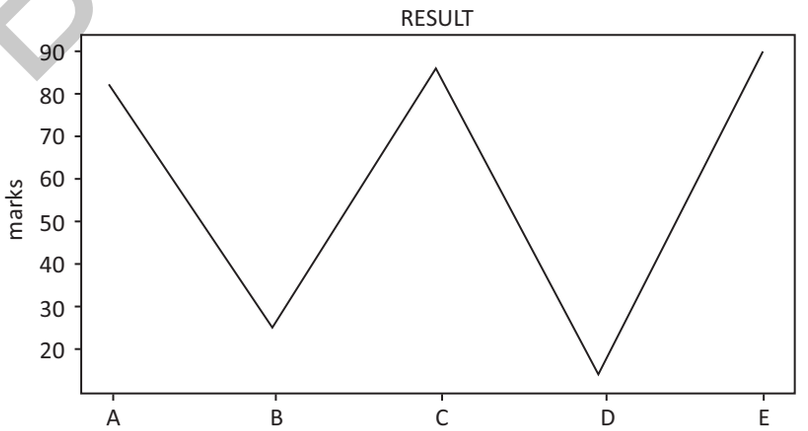
(c) del stud["address",axis=1] (d) del stud["address"]

29. _____ is any identifier which is guaranteed to be unique among all objects and is used for identifying various objects.

(a) Primary identifier (b) Personal identifier

(c) Private identifier (d) Unique identifier

30. Observe the following figure.



Identify the statement for writing 'names' in figure.

(a) p1.xlabel("names") (b) p1.labelx("names") (c) p1.xhead("names") (d) p1.xtitle("names")

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31. Read the statements given below and identify the right option while draw a Line Chart.

Statement A: In x axis, data must be in sorted manner (ascending or descending order)

Statement B: In y axis, values must be of integer data type only

(a) Statement A, B both are correct

(b) Statement A, B both are incorrect

(c) Statement A is correct, but Statement B is incorrect

(d) Statement A is incorrect, but Statement B is correct

32. The command used to set the label of y axis is _____

(a) plt.yaxis() (b) plt.labely() (c) plt.ytitle() (d) plt.ylabel()

33. Sangeeta is confused about the open source web browser. Help her in choosing open source web browser for her device.

(a) Linux (b) Ubuntu (c) MS Office (d) Google Chrome

34. Consider the following statements with reference to cyber crime:

(i) Stealing away a brand new computer from a showroom.

(ii) Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.

(iii) Secretly copying files from server of a call centre and selling it to the other organisation.

(iv) Viewing sites on a internet browser.

Which out of the following comes under Cyber Crime?

(a) Statements (i) and (ii). (b) Statements (ii) and (iii).

(c) Statements (iii) and (iv). (d) Statements (ii) and (iv).

35. Consider the following series named Result.

Rohan	90
Aman	60
Divya	34
Jeet	78
Raj	25
Jyoti	85
Gagan	32

Write the output of the command:

```
print(Result[-1:-5])
```

(a) No output

(b)

Gagan	32
Divya	34
Raj	25
Aman	60

(c)

Aman	60
Divya	34
Jeet	78
Raj	25
Divya	34

(d)

Gagan	32
Jyoti	85
Raj	25
Jeet	78

36. Ravi received a mail form IRS department. On clicking "ClickHere", he was taken to a site designed to imitate an official-looking website, such as IRS.gov for uploading some important information on it. What do you think he should do?

(a) ignore it and dont give any response

(b) reply back to them and share his personal information

(c) delete the mail and hope they'll leave him alone in future

(d) go to the cyber police and do register the complaint

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37. From the following dataframe df, calculate the sum of sal and bonue of 1st row (index value 0) using loc

	ENam	Sal	Bonus
0	Kavita	50000	3000
1	Sudha	60000	4000
2	Garima	55000	5000

(a) print(df.loc[0,'Sal']+df.loc[0,'Bonus'])
(b) print(df.loc[1,'Sal']+df.loc[0,'Bonus'])
(c) print(df.loc[0,'Sal']+df.loc[1,'Bonus'])
(d) print(df.loc[1,'Sal']+df.loc[1,'Bonus'])

38. Which of the following is not a characteristic of Open Source Software? **[2011 SP]**

(a) Its source code is available for modification
(b) It is owned by a company or an individual
(c) It can be downloaded from internet
(d) None of the above

39. Difference between loc() and iloc().:

(a) Both can be used in slicing of data from the Pandas DataFrame
(b) Both can not be used in slicing of data from the Pandas DataFrame
(c) Only loc( ) can be used in slicing of data from the Pandas DataFrame
(d) Only iloc() can be used in slicing of data from the Pandas DataFrame

40. Given the following two series P1 and P2

Give the output of following command.

```
print(P1+P2)
```

P1		P2	
A	100	C	200
B	200	D	400
C	300	E	600
D	400	F	800
E	500	G	1000

(a)
C	500.0
D	800.0
E	1100.0

(b)
A+C	200.0
B+D	600.0
C+E	900.0
D+F	1200.0
E+G	1500.0

(c)
A	NaN
B	NaN
C	500.0
D	800.0
E	1100.0
F	NaN
G	NaN

(d) No output

41. Windows software come under_____ category.

(a) Proprietary
(b) FOSS
(c) Freeware
(d) Shareware

42. Consider the following dataframe df

	House	First	Second	Third
0	Chenab	5	7	6
1	Ganges	10	5	4
2	Jamuna	8	13	15
3	Jhelum	12	9	12
4	Ravi	5	11	10
5	Setluj	10	5	3

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Choose the correct statement to display the house names where the number of Second Prizes are in the range of 12 to 20.

(a) df['Name'][(df['Second']>=12) and (df['Second']<=20)]

(b) df[Name][(df['Second']>=12) & (df['Second']<=20)]

(c) df['Name'][(df['Second']>=12) & (df['Second']<=20)]

(d) df[(df['Second']>=12) & (df['Second']<=20)]

43. Write the output of the given command:

```
import pandas as pd
s=pd.Series([10,20,30,40,50],[1,2,3,4,5])
print(s.iloc[2])
```

(a) 10 (b) 20 (c) 30 (d) 40

44. Consider the following dataframe Climate

Year	MaxTemp	MinTemp	Rainfall
2017	32	20	123
2018	33	22	140
2019	35	21	135
2020	34	23	160

Which of the following statement/s will give the exact number of values in each column of the dataframe?

(i) print(Climate.count()) (ii) print(Climate.count(0))

(iii) print(Climate.count) (iv) print(Climate.count(axis='index'))

Choose the correct option:

(a) both (i) and (ii) (b) only (ii)

(c) (i), (ii) and (iii) (d) (i), (ii) and (iv)

45. An organisation purchases new computers every year and dumps 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:

(a) Solid Waste (b) Commercial Waste (c) E-Waste (d) Business Waste

46. Consider the dataframe df

	empno	name	salary
A1	101	a	3000
A2	102	b	5000
A3	103	c	8000
A4	104	d	9000

Choose the correct option to display the following output

	empno	salary
A1	101	3000
A4	104	9000

(a) `print(df.loc[['A1':'A4'],['empno','salary']])`

(b) `print(df.loc['A1':'A4',['empno','salary']])`

(c) `print(df.loc['A1','A4',['empno','salary']])`

(d) `print(df.loc[['A1','A4'],['empno','salary']])`

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47. Consider the dataframe "EMP"

	Name	Basic	Da	Hra
E1	Sanya	9500	3000	2000
E2	Krish	7000	5000	1900
E3	Rishav	9650	1500	2100
E4	Deepak	7500	2000	2700
E5	Kriti	9200	1800	500

Choose command to change the naame 'Rishav' to 'Rishab'

(a) EMP.loc[2,0]='Rishab'
(b) EMP.change['E3','Name']='Rishab'
(c) EMP.rename[2,0]='Rishab' #or
(d) EMP.rename['Rishav']='Rishab'

48. Consider the following data frame name df

	roll	name	marks
0	1	aman	25.0
1	2	bhavna	NaN
2	3	rahul	60.0

Write the output of the given command:

```
print(df.shape)
```

(a) (3,3) (b) (3,2) (c) (2,3) (d) (2,2)

49. Read the statements given below. Identify the right option from the following for attributes in dataframe.
Statement A: The shape attribute returns the number of rows and number of columns available in dataframe.
Staement B: The shape attribute return the values in form of list.

(a) Both statements are correct.
(b) Both statements are incorrect.
(c) Statement A is correct, but Statement B is incorrect
(d) Statement A is incorrect, but Statement B is correct

SECTION - C

Section C consists of 6 Questions (50 to 55). Attempt any 5 questions.

Mr. Rajat is working as data analyst in Company, and he has provided some data. On which he wants to do some operations, but he is facing some problem, help him:

DataFrame :Faculty

	FNAME	AGE	DEPARTMENT	GRADE
0	Moksha	30	Biology	A
1	Malini	35	Maths	A
2	Akshit	43	English	B
3	Nishant	27	Maths	B

50. Which of the following command(s) will display the information whose grade is "A"?

(i) print(Faculty[Faculty.Grade= ="A"])
(ii) print(Faculty[Faculty['Grade']= ='A'])
(iii) print(Faculty['Grade']= ='A')
(iv) print(Faculty.Grade= ='A')
(a) only (i) (b) (i) and (ii) (c) (ii) and (iii) (d) (iii) and (iv)

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51. Which of the following command(s) is used to add new row at the end of dataframe with values ('Ankur',30,'Computer','A')?

(i) Faculty.insert('Ankur',30,'Computer','A')

(ii) Faculty.loc[4]=['Ankur',30,'Computer','A']

(iii) Faculty.row('Ankur',30,'Computer','A')

(iv) Faculty=Faculty.append({'Fname':Ankur,'Age':30,'Department':'Computer','Grade':'A'},ignore_index=True)

(a) (i) only (b) (i) and (iii) (c) (i) and (iv) (d) (ii) and (iv)

52. Select the correct option to delete the row whose index value is 1

(i) Faculty=Faculty.drop(df.index[1]) (ii) Faculty=Faculty.drop(1)

(iii) Faculty=Faculty.drop(1,axis=0) (iv) Faculty= Faculty.drop(1,0)

(a) only (i) is correct (b) (i) and (ii) are correct

(c) (i), (ii) and (iii) are correct (d) all are correct

53. Which of the following command is used to display the grade of Fname Akshit?

(a) print(Faculty.loc[2,3]) (b) print(Fauclty.iloc[2,3])

(c) print(Fauclty.iloc[2,4]) (d) print(Fauclty.iloc[3,4])

54. Choose the correct option to change the name of index 0 to new name 'x'.

(a) Faculty.indexname({0:'x'},inplace=True)

(b) Faculty.rowname({0:'x'},inplace=True)

(c) Faculty.newname({0:'x'},inplace=True)

(d) Faculty.rename({0:'x'},inplace=True)

55. He wants to show name of columns.

(a) print(Faculty.axes[0]) (b) print(Faculty.columns)

(c) print(Faculty.colname) (d) print(Faculty.col.name)

ANSWERS

1. (a)	**2.** (c)	**3.** (b)	**4.** (a)	**5.** (c)	**6.** (b)	**7.** (c)	**8.** (c)	**9.** (c)	**10.** (a)
11. (b)	**12.** (c)	**13.** (c)	**14.** (d)	**15.** (a)	**16.** (c)	**17.** (c)	**18.** (a)	**19.** (a)	**20.** (c)
21. (c)	**22.** (a)	**23.** (a)	**24.** (d)	**25.** (a)	**26.** (d)	**27.** (b)	**28.** (d)	**29.** (d)	**30.** (a)
31. (b)	**32.** (d)	**33.** (d)	**34.** (b)	**35.** (a)	**36.** (d)	**37.** (a)	**38.** (b)	**39.** (a)	**40.** (c)
41. (a)	**42.** (c)	**43.** (c)	**44.** (d)	**45.** (c)	**46.** (d)	**47.** (a)	**48.** (a)	**49.** (c)	**50.** (b)
51. (d)	**52.** (d)	**53.** (b)	**54.** (d)	**55.** (b)					

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