KENDRIYA VIDYALAYA SANGATHAN
ERNAKULAM REGION
केंद्रीय विद्यालय संगठन क्षेत्रीय कार्यालय, एर्नाकुलम

तत् त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

SESSION 2023-24
CLASS XII
INFORMATICS PRACTICES

VERSION A
COMPENDIOUS STUDENT SUPPORT MATERIAL

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MESSAGE BY THE DEPUTY COMMISSIONER

I am delighted to announce the release of Support Material/Study material for the students of class X and XII. In our relentless pursuit of academic excellence, we have been constantly revising and upgrading our teaching methodologies and resources. And one of the important resources is the support material which is prepared by Kendriya Vidyalayas for the students of class X and XII. This Support material is in two parts: Part A is the core concepts/topics of all subjects which aims minimum level of learning for each student and Part B is a detailed topics/lessons with practice questions which aims to foster a deeper understanding of subjects, stimulate critical thinking and helps in achieving better score in CBSE exam. Whereas Part A is planned to be printed and distributed amongst all students whereas Part B which is the larger one is planned to disseminate through electronic media/blogs.

I hope this support material in two parts will greatly benefit the academic journey of class X and XII not only in pursuit of good result in CBSE exams but also helpful for various entrance examinations.

Let's march ahead with dedicated minds and relentless endeavours for better future through better education.

With warm regards,

Shri. Santosh Kumar N

Deputy Commissioner

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INDEX

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Informatics Practices
CLASS XII
Code No. 065
2023-2024

DISTRIBUTION OF MARKS:

Unit No.	Unit Name	Marks
1	Data Handling using Pandas and Data Visualization	25
2	Database Query using SQL	25
3	Introduction to Computer Networks	10
4	Societal Impacts	10
	Total	**70**

Unit 1: Data Handling using Pandas -I
Introduction to Python libraries- Pandas, Matplotlib

Data structures in Pandas - Series and Data Frames.
Series: Creation of Series from – ndarray, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing and Slicing.
Data Frames: creation - from dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing;
Importing/Exporting Data between CSV files and Data Frames.

Data Visualization
Purpose of plotting; drawing and saving following types of plots using Matplotlib – line plot, bar graph, histogram
Customizing plots: adding label, title, and legend in plots.

Unit 2: Database Query using SQL
Revision of database concepts and SQL commands covered in class XI
Math functions: POWER (), ROUND (), MOD ().
Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().
Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().
Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (*).
Querying and manipulating data using Group by, Having, Order by.
Working with two tables using equi-join

Unit 3: Introduction to Computer Networks
Introduction to networks, Types of network: PAN, LAN, MAN, WAN.
Network Devices: modem, hub, switch, repeater, router, gateway
Network Topologies: Star, Bus, Tree, Mesh.
Introduction to Internet, URL, WWW, and its applications- Web, email, Chat, VoIP.

Website: Introduction, difference between a website and webpage, static vs dynamic web page, web server and hosting of a website.
Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

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

Practical Marks Distribution

S. No.	**Unit Name**	**Marks**
1	Programs using Pandas and Matplotlib	8
2	SQL Queries	7
3	Practical file (minimum of 15 programs based on Pandas, 4 based on Matplotlib and 15 SQL queries must be included)	5
4	Project Work (using concepts learned in class XI and XII)	5
5	Viva-Voce	5
	TOTAL	30

UNIT-I

Data Handling using Pandas

Data structures in Pandas - Series and Data Frames.

Series :

Series is an important data structure of pandas. It represents one dimensional array, containing a group of homogeneous data.

Series() function is used to create a series in Pandas.

Example:

```
import pandas as pd
ser1=pd.Series()
```

An empty pandas series has float64 data type.

Creating non-empty series In non-empty series data and index will be supplied while creating series. Here data can be one of these data types:

1. A python sequence

Creating Series from a List/Tuple

<series object>=pandas.Series(<list/tuple>,index=<python sequence>)

2. An ndarray

<series object>=pandas.Series(<ndarray>, index=<python sequence>)

3. A dictionary

<series object>=pandas.Series(<dictionary>,index=<Python sequence>)

4. A scalar value

<series object>=pandas.Series(<scalar value>,index=<Python sequence>)

ACCESSING DATA

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)

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)

Mathematical Operations on Series

All arithmetic operations like addition, subtraction, multiplication, division etc. can be done on Series objects

The arithmetic operation is performed only on matching indexes. If the indexes are not matching, NaN will be produced as output.

Eg;

```
import pandas as pd s1=pd.Series([15,20,21], index=['A','B','C'])
s2=pd.Series([10,10,6], index=['A','B','D'])
print('Series object 1(s1)')
print(s1)
print('Series object 2(s2)')
print(s2)
```

Output:

```
Series object 1(s1)
A    15
B    20
C    21
Series object 2(s2)
A    10
B    10
D    6
```

Arithmetic operation	Operator	Example
Addition	+ or *add*	**>>>s1+s2 or >>>s1.add(s2)** Output A 25.0 B 30.0 C NaN D NaN
Subtraction	- or *sub*	**>>>s1-s2 or >>>s1.sub(s2)** Output A 5.0 B 10.0 C NaN D NaN

Multiplication	* or mul	**>>>s1*s2or >>>s1.mul(s2)** Output A 150.0 B 200.0 C NaN D NaN
Division	/ or div	**>>>s1/s2or >>>s1.div(s2)** Output A 1.5 B 2.0 C NaN D NaN
Modulus	% or mod	**>>> s1 % s2 or >>> s1.mod(s2)** Output A 5.0 B 0.0 C NaN D NaN

	PANDAS SERIES
1	To create an empty Series object, you can use (a) pd.Series(empty) (b) pd.Series( ) (c) pd.Series(np.NaN) (d) All of these
2	Which of the following attribute returns the total number of values in a Series S? (a) shape (b) size (c) values (d) itemsize
3	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','ers']) print(s['charu'])
4	What is the correct output for following Python code: import pandas as pd data = {"Marks1": 90, "Marks2": 95, "Marks3": 97} ser = pd.Series(data) print(ser)
5	What will be the output of the following code: import pandas as pd S1=pd.Series([18,24,80],index=['V','Y','Z']) S2=pd.Series([9,12,7,8],index=['X','Y','Z','V'])

	df=pd.DataFrame(S1+S2) print(df)
6	Assertion (A) : pandas is an open source Python library which offers high performance, easy-to-use data structures and data analysis tools. Reason (R) : Professionals and developers are using the pandas library in data science and machine learning. A. Both A and R are true and R is the correct explanation of A B. Both A and R are true but R is not the correct explanation of A C. A is true but R is false D. A is false but R is true E. Both A and R are false
7	Consider the following Series object, S1: Table 1350 Chair 1200 Sofa 1800 Dining Table 3200 (i) Write the command which will display the names of the furniture having rent>1200. (ii) Write the command to rename the Table asStand.
8	Consider the Series S1 . series S1: Indices / Data 0 347 1 892 2 511 3 729 What will be the output of the following statements? (a)print(S1.index) (b)print(S1.values) (c)print(S1[2:2]) (d)print(S1[1:]) (e)print(S1[:2] (f)print(S1[:3:2])
9	What will be the output of following code: import pandas as pd s=pd Series([80,90,89,60,50],index =['Eng','Hin','Mat','Sci','SSt']) print(s['Eng','Sci'])
10	Consider the following Series object, S IP 95 Physics 89 Chemistry 92 Math 95 i. Write the Python syntax which will display only IP. ii. Write the Python syntax to increase marks of all subjects by 10.
11	Ananya wants to store her Term-I mark in a Series which is already storedin a NumPy array. Choose the statement which will create the series with Subjects as indexes and Marks as elements.

	import pandas as pd import numpy as np Marks=np.array([30,32,34,28,30]) subjects=['English','Maths','Chemistry','Physics','IP'] Series1=_____ a) pd.Series(Marks,index=subjects) b) pd.Series(np.Marks,index=subjects) c) pd.Series(index=Marks,subjects) d) pd.Series(Marks,index)
12	Read the statements given below and identify the right option Assertion (A): You need to install the pandas library using the pip install command. Reason (R): You can also access pandas without installation. a) Both A and R are true and R is the correct explanation of A b) Both A and R are true but R is not the correct explanation of A c) A is true but R is false d) A is false but R is true
13	Write python code to create the following series using Dictionary: 101 Harsh 102 Arun 103 Ankur 104 Harpahul 105 Divya 106 Jeet
14	(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'
15	Read the statements given below and identify the right option Statement 1: Series is a one-dimensional labeled array capable of holding any data type Statement 2: If data is an ndarray, index must be the same length as data. a) Statement 1 is correct, statement 2 is wrong b) Statement 1 is wrong, Statement 2 is correct c) Both statement 1 and statement 2 are correct

	Both statements are incorrect
16	Read the statements given below and identify the right option Assertion (A): We cannot modify the values of Series elements once created. Reason (R): Series is an immutable object. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true and R is not the correct explanation of A. c) A is true but R is false. d) Both A and R are false
17	Which of the following are valid operations on Series 'S1'? a) S1 + 2 b) S1 ** 2 c) S1 * 2 d) All of the above
18	Assertion (A): We can add two series objects using addition operator (+) or calling explicit function add() . Reason (R): While adding two series objects index matching is implemented and missing values are filled with NaN by default. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true
19	Identify the correct option Assertion (A): We can perform mathematical operations on two series objects of different size but not on two 1 D arrays of different size. Reason (R) : if two series are not aligned NaN are generated but in case of arrays no concept of NaN and hence operations fail to perform. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.
20	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]])

	ANSWERS
1	(b) pd.Series( )
2	(b) size
3	3
4	Marks1 90 Marks2 95 Marks3 97 dtype: int64
5	0 V 26.0 X NaN Y 36.0 Z 87.0
6	A. Both A and R are true and R is the correct explanation of A
7	(i) s1[s1>1200].index (ii) s1=s1.rename({"Table":"stand"})
8	(a) Index([0, 1, 2, 3], dtype='int64') (b) [347 892 511 729] (c) Series([ ], dtype: int64) (d) 1 892 2 511 3 729 (e)0 347 1 892 (f)0 347 2 511
9	(c) Error [correction needed as print(s['Eng':'Sci']), to get output]
10	(i)print(S.index[0]) OR print(S['IP']) (ii)S=S+10
11	a
12	c
13	import pandas as pd D={ 101:"Harsh",102:"Arun",103:"Ankur",104:"Harpahul",105:"Divya" ,106:"Jeet" } s=pd.Series(D) print(s)
14	(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]]) (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'])
15	c
16	d
17	d
18	a
19	a
20	15 0 15 3 39 4 -90

DATA FRAMES

❖ DataFrame Data Structure:

- It is **two dimensional (tabular) heterogeneous data labelled array.**
- It has two indices or two axes: **a row index (axis=0)** and a **column index (axis=1).**
- The **row index is known as index** and **the column index is** called the **columns.**
- The indices can be of any data type.
- It is both **value mutable** and **size mutable.**
- We can perform arithmetic operations on rows and columns.

❖ Creating and Displaying a DataFrame:

➢ **To create Empty DataFrame:**

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

➢ **To create DataFrame from 2D dictionary:**

A 2D dictionary is a dictionary having items as (key : value) where value part is a data structure of any type : a list, a series, a dictionary etc. But the value parts of all the keys should have similar structure and equal lengths.

✓ **Creating a DataFrame from 2D dictionary having values as lists:**

```
dict1={'Students':['Neha','Maya','Reena'],
'Marks':[20,40,30],
'Sports':['Cricket', 'Football','Badminton']}
df1=pd.DataFrame(dict1)
print(df1)
```

	Students	Marks	Sports
0	Neha	20	Cricket
1	Maya	40	Football
2	Reena	30	Badminton

- The **keys of the dictionary have become columns.**
- The columns are placed in sorted order.
- The index is assigned automatically (0 onwards).

We can specify our own index too by using the index argument.

```
df2=pd.DataFrame(dict1, index=['I','II','III'])
print(df2)
```

	Students	Marks	Sports
I	Neha	20	Cricket
II	Maya	40	Football
III	Reena	30	Badminton

- The number of indexes given in the **index sequence must match the length of the dictionary's values**, otherwise Python will give error.

- ✓ **Creating a DataFrame from 2D dictionary having values as Series objects.**

```
smarks=pd.Series([80,90,70],index=['Neha','Maya','Reena'])
sage=pd.Series([25,30,29],index=['Neha','Maya','Reena'])
dict={'Marks':smarks,'Age':sage}
df3=pd.DataFrame(dict)
print(df3)
```

	Marks	Age
Neha	80	25
Maya	90	30
Reena	70	29

- **Creating a DataFrame from list of dictionaries: -**

```
student=[{'Neha':50,'Manu':40},{'Neha':60,'Maya':45}]
df4=pd.DataFrame(student,index=['term1','term2'])
print(df4)
```

	Neha	Manu	Maya
term1	50	40.0	NaN
term2	60	NaN	45.0

  - NaN is automatically added in missing places.

❖ Selecting or Accessing Data

```
import pandas as pd
dict={'BS':[80,98,100,65,72],'ACC':[88,67,93,50,90],
   'ECO':[100,75,89,40,96],'IP':[100,98,92,80,86]}
df5=pd.DataFrame(dict,index=['Ammu','Achu','Manu','Anu','Abu'])
print(df5)
```

	BS	ACC	ECO	IP
Ammu	80	88	100	100
Achu	98	67	75	98
Manu	100	93	89	92
Anu	65	50	40	80
Abu	72	90	96	86

- **Selecting / Accessing a column:-**

```
print(df5.BS)
or
print(df5['BS'])
```

- **Selecting / Accessing multiple columns: -**
  - Columns appear in the order of column names given in the list inside square brackets.

```
print(df5[['BS','IP']])
```

	BS	IP
Ammu	80	100
Achu	98	98
Manu	100	92
Anu	65	80
Abu	72	86

- **Selecting / Accessing a subset from a DataFrame using Row/Column names:-**
  - **To access a row:**

```
print(df5.loc['Ammu', :])
```

```
BS      80
ACC     88
ECO    100
IP     100
Name: Ammu, dtype: int64
```

  - **To access multiple rows:**

```
print(df5.loc['Ammu':'Manu', : ])
```

	BS	ACC	ECO	IP
Ammu	80	88	100	100
Achu	98	67	75	98
Manu	100	93	89	92

  - **To access selective columns:**

```
print(df5.loc[:,'ACC':'IP'])
```

	ACC	ECO	IP
Ammu	88	100	100
Achu	67	75	98
Manu	93	89	92
Anu	50	40	80
Abu	90	96	86

- **To access range of columns from a range of rows:**

print(df5.loc['Manu':'Abu','ACC':'ECO'])

	ACC	ECO
Manu	93	89
Anu	50	40
Abu	90	96

- **Selecting / Accessing a subset from a DataFrame using Row/Column numeric index/position: using *iloc***

Sometimes our dataframe object does not contain row or column labels or even we may not remember, then to extract subset from dataframe we can use iloc.

- When we use iloc, then end index is excluded.

print(df5 . iloc[1:3,1:3])

- **Selecting / Accessing individual value:**
  - There are different methods():

(i) print(df5. ACC['Achu']) 67

or

print(df5. ACC[1])

(ii) Using at or iat

print(df5.at['Achu','ACC']) 67

or

print(df5.iat[1,1])

❖ Assigning / Modifying Data Values in DataFrame

- **To change or add a column**

	BS	ACC	ECO	IP	ENG
Ammu	80	88	100	100	60
Achu	98	67	75	98	60
Manu	100	93	89	92	60
Anu	65	50	40	80	60
Abu	72	90	96	86	60

- If the given column name does not exist in DataFrame then a new column with the name is added.

df5['ENG']=60
print(df5)

- If you want to add a column that has different values for all its rows, then we can assign the data values for each row of the column in the form of a list.

df5[‘ENG’]=[50,60,40,30,70]

- There are some other ways for adding a column to a database.

df5.at[: ,'ENG']=60
print(df5)

or

df5.loc[: ,'ENG']=60
print(df5)

- **To change or add a row:**

df5.at['Sabu', :]=50
print(df5)

or

df5.loc['Sabu', :]=50

	BS	ACC	ECO	IP	ENG
Ammu	80.0	88.0	100.0	100.0	60.0
Achu	98.0	67.0	75.0	98.0	60.0
Manu	100.0	93.0	89.0	92.0	60.0
Anu	65.0	50.0	40.0	80.0	60.0
Abu	72.0	90.0	96.0	86.0	60.0
Sabu	50.0	50.0	50.0	50.0	50.0

print(df5)

- If there is no row with such row label, then adds new row with this row label and assigns given values to all its columns.

➢ **To change or modify a single data value**

df5.BS['Ammu']=100
print(df5)
or
df5.BS[0]=100
print(df5)

	BS	ACC	ECO	IP	ENG
Ammu	100.0	88.0	100.0	100.0	60.0
Achu	98.0	67.0	75.0	98.0	60.0
Manu	100.0	93.0	89.0	92.0	60.0
Anu	65.0	50.0	40.0	80.0	60.0
Abu	72.0	90.0	96.0	86.0	60.0
Sabu	60.0	60.0	60.0	60.0	60.0

❖ Deleting columns in DataFrame

➢ We can use **del** statement, to delete a column

del df5['ENG']

➢ We can use **drop()** also to delete a column. **By default axis=0.**

df5=df5.drop(['ECO'], axis =1)
df5=df5.drop(columns=['ECO','IP'])

➢ We can use **pop()** to delete a column. The deleted column will be returned as Series object.

bstud=df5.pop('BS')
print(bstud)

❖ Deleting rows in DataFrame

df5=df5.drop(['Ammu','Achu'])
or
df5=df5.drop(index=['Ammu','Achu'])

Iterating over a DataFrame

➢ **Using pandas.iterrows() Function- Rowwise**

```
import pandas as pd
dict={'BS':[80,98],'ACC':[88,67]}
df5=pd.DataFrame(dict,index=['Ammu','Achu'])
print(df5,"\n")

for (row,rowseries) in df5.iterrows():
    print("Row index:",row)
    print("containing")
    i=0
    for val in rowseries:
        print("At position ",i,":",val)
        i=i+1
    print()
```

```
      BS  ACC
Ammu  80   88
Achu  98   67

Row index: Ammu
containing
At position  0 : 80
At position  1 : 88

Row index: Achu
containing
At position  0 : 98
At position  1 : 67
```

➢ **Using pandas.iteritems() Function - Columnwise**

```
import pandas as pd
dict={'BS':[80,98],'ACC':[88,67]}
df5=pd.DataFrame(dict,index=['Ammu','Achu'])
print(df5,"\n")

for (column,columnseries) in df5.iteritems():
```

```
      BS  ACC
Ammu  80   88
Achu  98   67

Column index: BS
containing
At row  0 : 80
At row  1 : 98

Column index: ACC
containing
At row  0 : 88
At row  1 : 67
```

```
print("Column index:",column)
print("containing")
i=0
for val in columnseries:
    print("At row ",i,":",val)
    i=i+1
print()
```

❖ Head and Tail Functions

- **head()**
  - **df5.head(5)**
  - **df5.head(2)**
- **tail()**
  - **df5.tail(5)**
  - **df5.tail(2)**

❖ Renaming index / column labels

- **rename()** renames the existing index or column labels in a DataFrame/series.

```
import pandas as pd
dict={'p_id':[101,102],'p_name':['Hard disk','Pen Drive']}
df=pd.DataFrame(dict)
print(df,"\n")
df.rename(columns={'p_id':'Product_ID','p_name':'product
                   _name'},inplace=True)
        or
df=df.rename(columns={'p_id':'Product_ID','p_name':'product_name'})
print(df)
```

```
   p_id     p_name
0   101  Hard disk
1   102  Pen Drive

   Product_ID product_name
0         101    Hard disk
1         102    Pen Drive
```

- Columns can also be renamed by using the **columns attribute** of DataFrame.

```
import pandas as pd
dict={'p_id':[101,102],'p_name':['Hard disk','Pen Drive']}
df=pd.DataFrame(dict)
df.columns=['Product_ID','product_name']
print(df,"\n")
```

❖ Reindexing

- **reindex()** used **to change the order** of the rows or columns in DataFrame/Series and **returns DataFrame/Series after changes.**

```
df=df.reindex(columns=['product_name','Product_I
                       D'])
print(df)
```

```
  product_name  Product_ID
0    Hard disk         101
1    Pen Drive         102
```

- If the mentioned indexes/columns do not exist in DataFrame, these will be added as per the mentioned order with NaN values.

```
df=df.reindex(columns=['product_nam
e','Product_ID','product_category'])
```

```
  product_name  Product_ID  product_category
0    Hard disk         101               NaN
1    Pen Drive         102               NaN
```

```
print(df)
```

❖ Boolean indexing

- There is one more way to index – Boolean Indexing (Setting row index to True/ False etc.)

```
import pandas as pd
dict={'p_id':[101,102,103],'p_name':
        ['Hard disk','Pen Drive','Camera']}
df=pd.DataFrame(dict)
df.index=[True,False,True]
print(df,"\n")
print(df.loc[True])
```

```
       p_id     p_name
True    101  Hard disk
False   102  Pen Drive
True    103     Camera

      p_id     p_name
True   101  Hard disk
True   103     Camera
```

❖ DataFrame attributes

All information related to a DataFrame object is available through attributes.

<DataFrane object> .<attribute name>

Attribute	Description
index	Returns the index (row labels) of the DataFrame
columns	Returns the column labels of the DataFrame
axes	Returns a list representing both the axes of the Data Frame (axis=0 i.e. index and axis=1 i.e. columns)
values	Returns a Numpy representation of the DataFrame
dtypes	Returns the dtypes of data in the DataFrame
shape	Returns tuple of the shape of the DataFrame
ndim	Returns number of dimensions of the dataframe
size	Returns the number of elements in the dataframe
empty	Returns True if the DataFrame object is empty, otherwise False
T	Transpose index and columns of DataFrame

❖ CSV file and DataFrame:

- Importing/Exporting Data between CSV file and DataFrame:
  - A CSV is a comma separated values file, which allows data to be saved in a tabular format.
  - CSV is a simple file such as a spreadsheet or database.
  - Files in the csv format can be imported and exported from Python programs
  - CSV files data fields are most often separated, or delimited by a comma. Here the data in each row are delimited by comma and individual rows are separated by newline.
- **Importing or converting the CSV file to DataFrame.**

1	Roll No	Name
2	1	Abhijith
3	2	Arjun
4	3	Anagha

```
import pandas as pd
df=pd.read_csv("D:\roll.csv")
print(df)
```

	Roll No	Name
0	1	Abhijith
1	2	Arjun
2	3	Anagha

- **Exporting DataFrame to CSV file.**
  - To export a data frame into a csv file first of all, we create a data frame say df1 and use dataframe.to_csv(‘ E:\Dataframe1.csv ’) method to export data frame df1 into csv file Dataframe1.csv.
  - Eg: DF

	Rollno	Name	Marks
Sec A	115	Pavni	97.5
Sec B	236	Rishi	98.0
Sec C	307	Preet	98.5
Sec D	422	Paula	98.0

DF.to_csv ("D:\DFoutput.csv")

	A	B	C	D
1		Rollno	Name	Marks
2	Sec A	115	Pavni	97.5
3	Sec B	236	Rishi	98
4	Sec C	307	Preet	98.5
5	Sec D	422	Paula	98

	PANDAS- DATAFRAME
1.	Write two differences between Series and DataFrame
2.	Create the following DataFrame using List of Dictionaries. A B C 0 1 2 3 1 5 6 8
3.	Which data types can be used to create DataFrame?
4.	Which library is to be imported to create DataFrame from Numpyndarrays ?
5.	_____ method in Pandas is used to change/modify the index of rows and columns of a DataFrame
6.	Give an example to create DataFrame from a single ndarray.
7.	Give an example to create DataFrame from two ndarray.
8.	Write the output of the following code: import numpy as np import pandas as pd A = np.array([35, 40, 71, 25]) B = np.array([27, 34, 56, 73]) C = [11, 22, 33, 44] DF = pd.DataFrame([A, B, C]) print(DF)
9.	Write the code in python to create DataFrame from given list. L1 = [“Anil”, “Ruby”, “Raman”, “Suman”] L2 = [35, 56, 48, 85]

10.	Fill in the blank to produce the Output. import pandas as pd L1 = ["Anil", "Ruby", "Raman", "Suman"] L2 = [35, 56, 48, 85] DF=pd.DataFrame([L1,L2], _____) print(DF) OUTPUT IstIIndIIIrdIVth a Anil Ruby Raman Suman b 35 56 48 85
11.	Which attribute of DataFrame is used to give user defined index value?
12.	Which attribute of DataFrame is used to give user defined column name?
13.	Complete the following code to get the Output given below: import pandas as _____ L1 = [["Aman", 45], ["Ankit", 56], ["_____", 67]] DF = pd._____(L1, _____=["Name", "Marks"], index=[_____]) print(DF) OUTPUT : Name Marks 1 Aman 45 2 Ankit 56 3 Sunita 67
14.	Consider the following DataFramedf and answer the questions import pandas as pd t={'rollno':[1,2,3,4,5,6], 'Name':['Krishna','Pranshu','Gurusha','Arpit','Rani','Aurobindo'], 'Age':[15,14,14,15,16,15], 'marks':[70.4,60.9,80.3,87.5,67.8,86.0], 'class':['11A','12B','11B','12B','12B','11B'] } df = pd.DataFrame(t, index=[10,20,30,40,50,60])
	(i) Write down the command that will give the following output : rollno 2 Name Pranshu Age 14 Marks 60.9 Class 12B Name: 20, dtype: object (A) print(df.iloc[1]) (B) print(df.loc[1]) (C) print(df.LOC[1]) (D) print(df.iloc(1))

	(ii) Which of the following commands is used to delete Age column in DataFramedf ? (A) df.drop('Age',axis=1,inplace=True) (B) df.drop('Age',axis=0,inplace=True) (C) df.drop['Age',axis=1,inplace=True] (D) df.delete('Age',axis=1,inplace=True)
	(iii) Which of the following command would rename the DataFramedf ? (A) df.rename(['marks','Term1'],inplace=True) (B) df.rename({'marks':'Term1'},inplace=True) (C) df.rename(columns={'marks':'Term1'},inplace=True) (D) df.rename(['marks':'Term1'],inplace=True)
15	Consider the code given below and answer the following questions: Ld = [{'a' : 10, 'b' : 20}, {'a' : 5, 'b' : 10, 'c' : 20}] DF = pd.DataFrame(Ld) print(DF) a. How many rows will be there in DataFrame "DF" b. How many columns will be there in DataFrame "DF" c. How many NaN will be there in DataFrame "DF" d. Write the missing import statement in the above code. e. How many dictionaries are used in the above code.
16	Differentiate between the following functions: (a) loc and iloc (b) at and iat
17	Distinguish between: (i) iterrows( ) and iteritems( )functions

Answers of DataFrame questions:

1.	Differences are: Series — DataFrame It is one dimensional data structure. — It is two-dimensional data structure. It has only row index — It has row as well as column index. Size immutable and value mutable — Size and value mutable Contains homogeneous data — Can hold heterogeneous data
2.	import pandas as pd LoD = [{'A':1,'B':2,'C':3},{'A':5,'B':6,'C':8}] DF = pd.DataFrame(LoD) print(DF)
3.	DataFrame can be created from: List Dictionary Tuple Series ndarrays
4.	numpy module
5.	rename( )

6.	import numpy as np import pandas as pd A = np.array([35, 40, 71, 25]) DF = pd.DataFrame(A) print(DF) OUTPUT: 0 1 2 3 0 35 40 71 25
7.	import numpy as np import pandas as pd A = np.array([35, 40, 71, 25]) B = np.array([27, 34, 56, 73]) DF = pd.DataFrame([A,B]) print(DF)
	OUTPUT:
	0 1 2 3 0 35 40 71 25 1 27 34 56 73
8.	0 1 2 3 0 35 40 71 25 1 27 34 56 73 2 11 22 33 44
9.	import pandas as pd L1 = ["Anil", "Ruby", "Raman", "Suman"] L2 = [35, 56, 48, 85] DF = pd.DataFrame([L1, L2]) print(DF)
10.	import pandas as pd L1 = ["Anil", "Ruby", "Raman", "Suman"] L2 = [35, 56, 48, 85] DF = pd.DataFrame([L1,L2], index=['a', 'b'],columns=["Ist", "IInd", "IIIrd", "IVth"]) print(DF)
11.	index
12.	columns
13.	import pandas as pd L1 = [["Aman", 45], ["Ankit", 56], ["Sunita", 67]] DF = pd.DataFrame (L1, columns = ["Name", "Marks"], index = [1, 2, 3]) print(DF)

14.	Consider the following DataFarmedf and answer the questions: import pandas as pd t={'rollno':[1,2,3,4,5,6], 'Name':['Krishna','Pranshu','Gurusha','Arpit','Rani','Aurobindo'], 'Age':[15,14,14,15,16,15], 'marks':[70.4,60.9,80.3,87.5,67.8,86.0], 'class':['11A','12B','11B','12B','12B','11B'] } df = pd.DataFrame(t,index=[10,20,30,40,50,60]) (i) (A) print(df.iloc[1]) (ii) (A) df.drop('Age',axis=1,inplace=True) (iii) (C) df.rename(columns={'marks':'Term1'},inplace=True)
15.	a. There will be 2 rows in dataframe "DF". b. There will be 3 columns in dataframe "DF". c. There will be 1 NaN in dataframe "DF". d. import pandas as pd e. 2
16.	**(a) iloc:** (i) iloc accesses data in a DataFrame with the help of integer based indexes. (ii) The indexing range includes the start index but not the end index. **loc:** (i) loc accesses data in a DataFrame with the help of label based indexes. (ii) The indexing range includes both start and end indexes (b) **at :**accesses a single value based on the labels. **iat :**accesses a single value based on the integer position.
17.	When iterrows( ) function iterates over a DataFrame, it will produce theoutput in the form of row-index and all the values in row-index will bein the form of a Series object. And when iteritems( ) function iterates overa DataFrame, it will produce the output in the form of column-indexand all the row values for the specified column will be in the form of aSeries object.

Importing and exporting data between CSV and Datafarmes.

1	Identify the function which can save dataframedf into csv file. (a) df. write_csv() (b) df.store_csv () (c) df.to_csv() (d) df.create_csv()
2	CSV stands for: (a) Common Standard Values (b) Comma Semicolon Values (c) Comma Separated Values (d) Comma Spreadsheet Values
3	Ekam, a Data Analyst with a multinational brand has designed the DataFrame df that contains the four quarter's sales data of different stores as shown below: Store Qtr1 Qtr2 Qtr3 Qtr4 0 Store1 300 240 450 230 1 Store2 350 340 403 210 2 Store3 250 180 145 160 Write Python statement to export the DataFrame to a CSV file named data.csv stored at D: drive.
4	ABC Enterprises is selling its products through three salesmen and keeping the records of sales done quarterly of each salesman as shown below: Quarter 1 Quarter 2 Quarter 3 Quarter 4 Salesman 1 23000 18000 30000 35000 Salesman 2 11000 15000 20000 22000 Salesman 3 60000 40000 35000 55000 Company is storing the above information in a CSV file "Qtrly_Sales.csv". Mr. Rohit is a programmer. He wrote Python code but he is facing some difficulties. Help him by giving the solutions of following situation: Python code: import pandas as pd df=_____("Qtrly_Sales.csv") Choose the correct option to read the csv file A. read_csv B. pd.read_csv C. pd.get_csv D. get_csv
5	Which of the following parameters of the read_csv function is used to make one of the columns of the data in the csv file as index of the data frame. (a) skiprows (b) index_row (c) nrows (d) index_col
6	Which argument do you specify with read_csv( ) to specify a separator character? (a) character (b) char (c) separator (d) sep
7	To read specific number of rows from a CSV file, which argument is to be given in read_csv( ) ? (a) rows = <n> (b) nrows = <n> (c) n_rows - <n> (d) number_rows = <n>
8	To skip first 5 rows of CSV file, which argument will you give in read_csv( ) ? (a) skip_rows = 5 (b) skiprows = 5 (c) skip - 5 (d) noread - 5
9	While writing a dataframe onto a CSV file, which argument would you use in for NaN values representation as NULL inside the file? (a) NaN = "NULL" (b) na_rep = "NULL" (c) na_value = "NULL" (d) na = "NULL"
10	In order to work with CSV files from Pandas, you need to import pandas, other than (a) csv (b) pandas.io (c) no extra package required (d) newcsv

Answers	
1	(c) df.to_csv()
2	(c) Comma Separated Values
3	df.to_csv(r"D:\data.csv")
4	pd.read_csv ()
5	(d) index_col
6	(d) sep
7	(b) nrows = <n>
8	b) skiprows = 5
9	(b) na_rep = "NULL"
10	(c) no extra package required

DATA VISUALIZATION

Data visualization is the presentation of data in graphical format. It helps people understand the significance of data by summarizing and presenting a huge amount of data in a simple and easy to understand format and helps communicate information clearly and effectively.

matplotlib

It is an amazing visualization library in Python that used for 2D plots of arrays. It is a multi-platform data visualization library which build NumPy arrays.

Importing pyplot

To import pyplot following syntax is

import matplotlib.pyplot or

import matplotlib.pyplot as plt

Steps to plot in matplotlib:

- Create a .py file & import matplotlib library to it using import statement
  - import matplotlib.pyplot as plt
- Set data points in plot( ) method of plt object
- Customize plot by setting different parameters
- Call the show() method to display the plot
- Save the plot/graph if required

Types of plot using matplotlib

- **LINE PLOT**
- **BAR GRAPH**
- **HISTOGRAM etc.**

LINE PLOT

Line chart: displaying data in form of lines.

- We can create line graph with x coordinate only or with x and y coordinates.
- Function to draw line chart – plot()
- Default colour of line- blue
- The default **width** for each bar is .**0.8** units, which can be changed.

Syntax: plt.plot(x,y)

Line Plot customization

- **Custom line color**

plt.plot(x,y,'red')
Change the value in color argument like 'b' for blue,'r','c',…

- **Custom line style and line width**

plt.plot(x,y, linestyle='solid' , linewidth=4).
setlinestyle to solid/dashed/dotted/dashdot
setlinewidth as required

- **Title**

plt.title('DAY – TEMP Graph ') – Change it as per requirement

- **Label-**

plt.xlabel('TIme') – to set the x axis label
plt.ylabel('Temp') – to set the y axis label

- Changing Marker Type, Size and Color

plt.plot(x,y,'blue',marker='*',markersize=10,markeredgecolor='magenta')

Order of methods used in plot() function:

plt.plot(x,y,color, linewidth, linestyle, marker, markersize, markeredgecolor)

Function used to show the graph – show()

plt.show( )

- **BAR GRAPH**

Syntax :plt.bar(x,y)

Bar graph customization

- **Custom bar color**

plt.bar(x,y, color="color code/color name")
To set different colors for different bars
plt.bar(x,y, color="color code/color name sequence")

- **Custom bar width**

plt.bar(x,y, width=float value)
To set different widths for different bars
plt.bar(x,y, width=float value sequence)

• **Title**
plt.title(' Bar Graph ') – Change it as per requirement
• **Label-**
plt.xlabel('Overs') – to set the x axis label
plt.ylabel('Runs') – to set the y axis label

HISTOGRAM

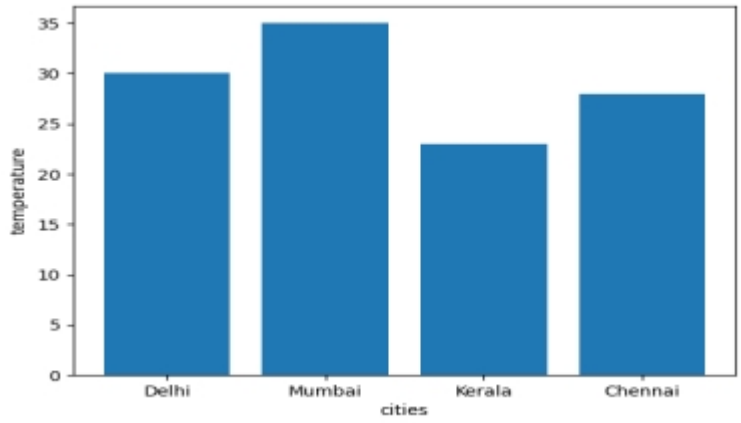
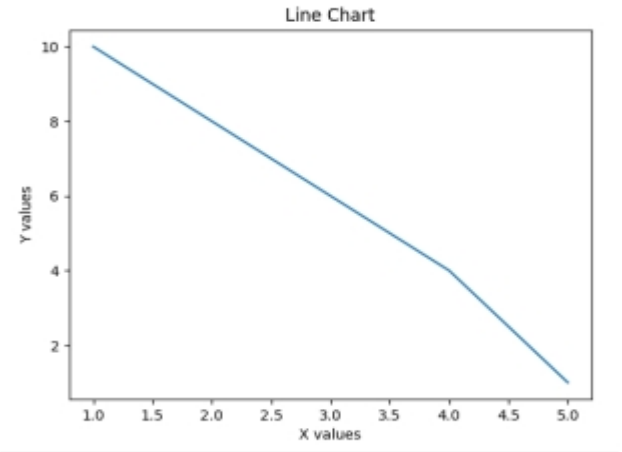
- **Syntax:plt.hist(x,other parameters)**

Optional Parameters

x	array or sequence of array
bins	optional parameter contains integer or sequence or strings
histtype	optional parameter used to create type of histogram [bar, barstacked, step, stepfilled], default is "bar"
align	optional parameter controls the plotting of histogram [left, right, mid]
orientation	Optional. Possible values are 'horizontal' or 'vertical'
color	optional parameter used to set color or sequence of color specs

QUESTIONS ON DATA VISULAIZATION

1.	A _____ is a tool that summarize discrete or continuous data.
2	A _____ function is used to create histogram.
3	Which is the library to be imported to for creating chart in python
4	Which module of matplotlib library is requires for plotting graph
5	Values displayed in X axis of bar chart is called-------?
6	Write python code to draw the following bar chart to represent temperature in different cities **with a suitable title**.

	 Also give suitable python statement to save this chart.
7	Write a python program to plot a line chart based on the given data y=[10,8,6,4,2] x=[1,2,3,4,5] 
8	The Marks of 10 students Total marks are given below: Marks=[445,341,442,342,343,244,141,440,443,344] Write suitable Python code to generate a histogram based on the given data, along with an appropriate chart title and both axis labels. Also give suitable python statement to save this chart.
9	The income of an employee for 5 days is as follows. Write python code to draw a line chart with the following details. Day=[‘Sunday’,’monday’, ‘Tuesday’, ‘Wednesday’, ‘Thursday’, ‘Friday’] Income=[510,350,475,580,600]
10	The number of students enrolled for various courses offered at an institute is given as follows.Write python code to draw a barchart based on the following data

	langs = ['C', 'C++', 'Java', 'Python', 'PHP'] students = [23,17,35,29,12]
11	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) d. Statement A is incorrect, but Statement B is correct Ans: Statement A is correct, but Statement B is incorrect
12	Which method is used to save the output of pyplot in the form of image file? a) savefig('filename') b) save_fig('filename') c) save_figure('filename') d) save_imgfig('filename')
13	ASSERTION(A) :A histogram is basically used to represent data provided in the form of groups spread in non-continuous ranges REASON(R) : matplotlib.pyplot.hist() function is used to compute and create histogram of a variable.
14	ASSERTION(A) : In histogram X-axis is about bin ranges where Y-axis talks about frequency REASON(R) : The bins (intervals) must be adjacent, and are often (but are not required to be) of equal size.

ANSWERS	
1	histogram
2	hist()
3	Matplotlib
4	pyplot
5	X ticks
6	import matplotlib.pyplot as p y=[30,35,23,28] x=['Delhi','Mumbai','Kerala','Chennai'] p.bar(x,y) p.xlabel("cities") p.ylabel("temperature") p.title('Temperature v/s City') p.show()
7	import matplotlib.pyplot as p y=[10,8,6,4,2] x=[1,2,3,4,5] p.plot(x,y) p.show()
8	import matplotlib.pyplot as plt Marks=[445,341,442,342,343,244,141,440,443,344] plt.hist(Marks) plt.title("Marks Chart") plt.xlabel("Total Marks") plt.ylabel("Number of students") plt.show()
9	Import matplotlib.pyplot as pp Day=['monday','tuesday','wednesday','thursday','friday'] Income=[510,350,475,580,600] pp.plot(day,income) pp.tile("Weekly income Report") pp.xlabel("Days") pp.ylabel("Income") pp.show()
10	import matplotlib.pyplot as plt langs=['C','C++','JAVA','PYTHON'.'PHP'] students=[23,17,35,29,12] fig=plt.bar(langs,students) plt.title("Mychart") plt.xlabel("Languages") plt.ylabel("No of Students")

	plt.show()
11	Statement A is correct, but Statement B is incorrect
12	a
13	A is false but R is true.
14	Both A and R are true

UNIT-II

Database Query using SQL

Database

A database is an organized collection of structured data, stored electronically in acomputer system.

Relational Database

A relational database is a collection of data items organized as logically related tables.

Database Management System

The software required to manage a database is known as a database management system (DBMS).

A DBMS serves as an interface between the database and its end users, allowing users to retrieve, update, and manage how the information is organized and optimized.

Table/Relation

A group of rows and columns form a table. The horizontal subset of the Table is known as a **Row/Tuple**. The vertical subset of the Table is known as **a Column/an Attribute.**

Database Terminology

Degree: No. of columns of Table.
Cardinality : No. of Rows of Table
Domain : A domain is the collection of values that a data element may contain.
Key : An Attribute/group of attributes in a table that identifies a tuple uniquely is known asa key.

A table may have more than one such attribute/group of identifies that identifies atuple uniquely, all such attributes(s) are known as **Candidate Keys.**

Out of Candidate keys, one is selected as **Primary key**, and othersbecome **Alternate Keys**.

A **Foreign Key** is defined in a second table, but it refers to the primary key in the first table.

SQL - Structured Query Language
Structured Query Language (SQL) is a specialized language for accessing and manipulating databases.

SQL commands are classified by function:

- **Data definition language (DDL)** - used to define or change database structure(s) (e.g., CREATE, ALTER, DROP)
- **Data manipulation language (DML)** - used to select or change data (e.g., INSERT, UPDATE, DELETE, SELECT)

CREATE DATABASE statement: The CREATE DATABASE statement is used tocreate a new SQL database.

Syntax:
CREATE DATABASE databasename;
CREATE DATABASE school;

SHOW DATABASES statement
The SHOW DATABASES statement is used to know the names of existing databases.

SHOW DATABASES;

USE statement
In order to use the database, the following SQL statement is required. Syntax:
USE databasename;

DROP DATABASE statement
The DROP DATABASE statement is used to delete a database from system. Syntax:

DROP DATABASE databasename;
DROP DATABASE school;

CREATE TABLE statement
A database consists of many tables. In order to create a table in database CREATE TABLE statement is used.

Syntax:
CREATE TABLE table_name
(
column_name1 data_type (size) constraint,
column_name2 data_type (size) constraint,
column_name3 data_type (size) constraint,

....
);

Data Types of attribute (column)

char(n): A FIXED length string. The n specifies the column length. The parameter n can be from 0 to 255. Default is 1
varchar(n) : A VARIABLE length string. The n parameter specifies the maximum column length in characters - can be from 0 to 65535
int :An integer. Range is from -2147483648 to 2147483647.
Float : A floating point number.
Date :A date. Format: YYYY-MM-DD.

Constraints
Constraints are the certain types of restrictions on the data values that an attribute can have.

Constraint	Description
NOT NULL	Ensures that a column cannot have NULL a value
UNIQUE	Ensures that all the values in a column are different
DEFAULT	Sets a default value for a column if no value is specified
PRIMARY KEY	The column which can uniquely identify each row/record in a table.
FOREIGN KEY	The column which refers to value of an attribute defined as primary key in another table

DESCRIBE statement
Provides a description of the specified table. Syntax:
DESCRIBE table_name;
DESCRIBE student;

INSERT INTO statement
Inserting a new row at the bottom of the table.
Syntax:INSERT INTO table_nameVALUES (value1, value2, value3,...);

INSERT INTO table_name (column1, column2,
column3,...)VALUES(value1,value2,value3,...);

INSERT INTO student VALUES(10, 'Alex', 7800, '1998-10-03','K12');

INSERT INTO student(rollnumber, name, fees, dob, class) values(11, 'Peter', 6700, '1997-11-15',

MODIFYING DATA IN TABLES
Syntax: UPDATE,TABLENAME> SET<COLNAME> = <VALUE>;

Write a command to modify the salary of all employee by increasing it with 5000.
UPDATE EMPSET SALARY = SALARY + 5000;

DELETING DATA FROMTABLES
Syntax: DELETE FROM <TABLE NAME> WHERE <SEARCH CONDITION>;
Write a command to delete all rows from EMP whose deptno is 10.
DELETE FROMEMP WHERE DEPTNO = 10;

ALTERINGTABLES
Syntax: ALTER TABLE <TABLENAME>; ADD/MODIFY/CHANGE <COLNAME><DATATYPE>;

Write a command to add a new column PHNO in table emp.
ALTER TABLE EMP**ADD** PHNO INT;
Write a command to modify column Job the table EMP , change the width of it to30.

ALTER TABLEEMP**MODIFY** JOB VARCHAR(30);
Write a command to change the existing column name ENAME to EMPNAME in table EMP.
ALTER TABLE EMP**CHANGE** ENAME EMPNAME VARCHAR(30);

DROPPINGTABLES
Syntax :
DROP TABLE [IF EXISTS] <TABLE NAME>;

Write a command to drop table emp.

DROPTABLE IF EXISTS EMP;

1.	With reference to SQL, identify the invalid data type. i. Date ii. Integer iii. Year iv. Month
2.	Write statement to create a database BANK
3.	Write statement to work with an existing database SCHOOL
4.	Write a DQL Query
5.	Write 2 queries of DML and DDL
6.	Assertion:MYSQL is Relational Database Management Sysytem Reason:SQL is language used to communicate with RDBMS i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False

	iv. A is false but R is True
7.	Consider the below table STUDENT <table><tr><th>RNO</th><th>NAME</th><th>MARKS</th></tr><tr><td>101</td><td>ABC</td><td>100</td></tr><tr><td>102</td><td>PQR</td><td>99</td></tr></table> Write statement to insert a row (103,'LMN')
8.	Write statement to delete row with roll no=103
9.	Write statement to create above table with roll no as primary key
10.	Write statement to update name of student to XYZ with roll no 101
11.	A database is a collection of _____ Records (b) Fields (c) Tables (d) Attributes
12.	_____organize collection of data as a collection of relations where each relation corresponds to a table of values. a. Data method b. Database c. Data system d. None of the above
13.	Advantages of using DBMS approach. a. Reduction in Redundancy b. Improved consistency c. Improved availability d. All of the above
14.	Based on which unique key, the records of a table are identified? (a) Candidate key (b) Foreign key (c) Alternate key (d) Primary key
15.	Which of the following is not a datatype in MySQL? (a)INT (b) LONG DOUBLE (c) DEC (d) DOUBLE
16.	The…….command can be used to makes changes in the structure of a table in SQL. (a)Select (b) Update (c) Change (d) Alter
17.	The _____ command can be used to add a new column to the table. (a)Select (b) Update (c) Change (d) Alter
18.	Foreign Key in a table is used to enforce a. Data dependency b. Referential Integrity c. Views d. Index Locations
19.	Which command is used to delete all the data of the table 'activity' retaining only structure? 1.Delete * from activity;

	2. Delete from activity; 3. Drop * from activity; 4. Drop all from activity
20.	_____ is a non-key attribute, whose values are derived from the primary key of some other table. 1. Primary Key 2. Foreign key 3. Candidate key 4. Alternate key
21.	What is significance of DROP Table command in MySQL? How is it different from DELETE command?
22.	Write an SQL query to create the table 'Menu' with the following structure: **Field** | **Type** | **Constraint** ItemCode | Varchar(5) | Primary Key ItemName | Varchar(20) | Category | Varchar(20) | Price | Decimal(5,2) |
23.	Write MySql command to create the Table STOCK including its Constraints. Table STOCK : **Name of Column** | **Type** | **Size** | **Constraint** Id | Decimal | 4 | Primary Key Name | Varchar | 20 | Company | Varchar | 20 | Price | Decimal | 8 | Not Null

Answers	
1	Month
2	create database bank;
3	use school;
4	select
5	DML-Insert ,Update DDL-Create ,Alter
6	Both A and R are true and R is not the correct explanation for A
7	insert into student(rno,name)values(103,'lmn');
8	delete from student where rno=103;

9	create table student (rnoint(5) primarykey,name varchar(15),marks int(4));
10	update student set name='xyz' where rno=101;
11	tables
12	Database
13	all of the above
14	Primary key
15	long double
16	Alter
17	Alter
18	Referential Integrity
19	Delete *from activity
20	Foreign key
21	The DELETE command is used to remove the contents of a table whereas, DROP command deletes the table along with the contents from a database
22	Create table menu(itemcode varchar(5) primary key, itemname varchar(20), category varchar(20), price decimal(5,2));
23	Create table stock(id decimal (4) primary key , name varchar(20), company varchar(20), price decimal(8) not null);

FUNCTIONin SQL

Function is a predefined command set that performs some operation and returns the single value. A function can have single, multiple or no arguments at all.

Types of SQL Functions:

1) **Single Row Functions:**
   - Single row function in SQL can be **character, numeric, date, and conversion functions**.
   - These functions are used to modify data items. These functions need one or more input and operate on each row, thereby returning one output value for each row

2) **Multiple row Functions (Aggregate Functions):**
   - The Multiple Row Functions in SQL are **used to return either group of values or a single value**.
   - These functions are basically operated on a set of rows and return one result or one result per group.
   - The Multiple row function in Oracle is also called group functions or it is also called aggregate functions.

Single Row Functions:

There are three types of Single Row Functions in SQL

1) Character/String Functions
2) Numeric Functions
3) Date and Time Functions

Character/StringFunctions:

i. CONCAT()
ii. LOWER()/LCASE()
iii. UPPER()/UCASE()
iv. LTRIM()
v. TRIM()
vi. RTRIM()
vii. SUBSTR()/MID()
viii. INSTR(),
ix. LENGTH()
x. RIGHT()
xi. LEFT()

Numeric/MathFunctions:

i. POWER(),
ii. ROUND(),
iii. MOD()

DateFunctions:

i. SYSDATE()
ii. NOW()
iii. DATE()
iv. MONTH()
v. YEAR()
vi. DAYNAME()
vii. MONTHNAME()
viii. DAY()

Aggregate functions summarize the results of a query and return a single value calculated from values in a column instead of providing the listing of all of the rows.

Syntax:

SELECT <FUNCION> (column_name) FROM <table_name>; The following are aggregate functions:

1) **SUM():** returns the total sum of a numeric column. It gives the arithmetic sum of all the values present in a particular column. It can take only one argument. NULL values are not included in the calculations. Example: SELECT SUM(MARKS) FROM STUDENT;

It displays sum of all the marks in the table student

2) **AVG():** returns the average value of any column or expression based on a column. NULL value not included

Example: SELECT AVG(MARKS) FROM STUDENT;

It displays average of all the marks in the table student

3) **MAX():** It returns the maximum value among the given set of values of any column or expression based on column.

Example: SELECT MAX(MARKS) FROM STUDENT;

It displays maximum marks from the column marks of student table.

4) **MIN():** It returns the minimum value among the given set of values of any column or expression based on column.

Example: SELECT MIN (MARKS) FROM STUDENT;

It displays minimum marks from the column marks of student table.

5) **COUNT()**: It count the number of non-null values in a column. It can take one argument, which can be a column name or *. When the argument is a column name then COUNT() returns the non-null values in that column. If the argument is an * then COUNT() counts the total number of records / rows along with the NULL values satisfying the condition, if any, in the table. So, it returns the total number of records or rows from the table.

Syntax: SELECT COUNT(COLUMN_NAME) FROM <TABLE_NAME>;

Example: SELECT COUNT(*) FROM STUDENT ;

It will give output as 10 rows.

But while writing SELECT COUNT(MARKS) FROM STUDENT;

Will give output as 7 because there will be 3 null values which is ignored by COUNT()

SORTING IN SQL ORDER BY

The **SQL ORDER BY** clause is used to sort data in ascending or descending order based on one or more columns.

It sorts record in ascending order by default.

To sort data in descending order DESC keyword is used.

Syntax:

SELECT <column_name> FROM <table_name> [where <condition>]

ORDER BY <column_name> [ASC/DESC];

Example: To display the roll number, name and marks of students on the basis of their marks in ascending order.

SELECT ROLLNO, NAME, MARKS FROM STUDENT ORDER BY NAME;

Sorting data on Multiple columns:

Syntax:

SELECT <column_name> FROM <table_name> [where <condition>]

ORDER BY <column_name> [ASC/DESC] ,<column_name> [ASC/DESC];

Example: To display the roll number, name and marks of all the students in descending order of their marks and ascending order of their names.

SELECT ROLLNO, NAME , MARKS FROM STUDENT ORDER BY MARKS DESC, NAME;

GROUP BY in SQL

At times we need to fetch a group of rows on the basis of common values in a column. This can be done using a GROUP BY clause.

It groups the rows tog-ether that contain the same values in a specified column. We can use the aggregate functions (COUNT, MAX, MIN, AVG and SUM) to work on the grouped values.

HAVING Clause in SQL is used to specify conditions on the rows with GROUP BY clause.

Syntax:

SELECT < column1, column2, …>, aggregate function(column name)

FROM <tablename> WHERE <condition> GROUP BY <column1> HAVING <condition>;

SQL BASED QUESTIONS

1.	Raj has written the below query with some errors in it: Select dept, count(empno) from emp where count(empno)>10 group by dept ; Please help him to select the correct query from the following options a. Select dept, count(empno) from emp group by deptwhere count(empno)>10 ; b. Select dept, count(empno) from empgroup by dept having count(empno)>10; c. Select dept, count(empno) from emp having count(empno)>10group by dept ; d. Select dept, count(empno) from empwhere count(empno)>10 group by dept ;
2.	Select the correct order of clauses in a Select statement: a. where , group by, having b. group by , having , where c. group by, where , having d. None of these
3.	Identify the logical mistake in the below query: Select dname,deptno,count(*) from department group by deptno; a. Aggregate function cannot be used in select clause with group by b. The column dname will not give a correct value as it has multiple values in each group c. Group by cannot be applied to deptno d. Deptno will not give a correct value as it has multiple values in each group.
4.	Which among the following is not an aggregate function? a. Min() b. Avg() c. Round() d. Sum()
5.	Consider a table with n rows. **Assertion(A):** The count(<column name>) function will always have n rows in the output. **Reason (R):** The count(<column name >) function will not count NULL values in the <column name>) a. Both A and R are True and R is the correct explanation for A b. Both A and R are True and R is not the correct explanation for A c. A is True but R is False d. A is False but R is True

6. Based on the SQL table MUSIC, write suitable queries for the following

Songid	Album	Cost	Quantity	Singer
1001	SAHER	150	4	JAGIT
1002	MADHUSHALA	250	6	MANNA
1003	IBADAT	180	8	RAFI
1004	KISMAT	180	6	RAFI
1006	BLACK	220	10	MICHEL
1007	MADHUSHALA	250	NULL	SHAKIRA
1008	IBADAT	180	3	RAFI
1009	SAHER	150	2	ASHA

1. Display singer wise average cost
2. Display the number of songs in each album
3. Display the album name and total quantity of each album whose total quantity is more than 10

OR

Predict the output of the following queries based on the table MUSIC as given above:

1. Select Album,count(quantity) from MUSIC group by Album;
2. Select sum(cost) from MUSIC group by singer;
3. Select cost*quantity from MUSIC where singer in ('RAFI','ASHA');

7. Consider the following table ITEM

CODE	NAME	PRICE
1785	JUICE	20
2172	TEA	12
1755	ICE CREAM	20
1793	COFFEE	15

a. Write the query to display NAME and PRICE in descending order of price
b. Write the query to display the items in ascending order of code
c. Write the query to display the items is descending order of price and within that in the alphabetical order of name

8. Consider the following tables:

Table: Doctors

DocID	DocName	Department
101	J K Mishra	Ortho
102	Mahesh tripathi	ENT
103	Ravi Kumar	Neuro
104	Mukesh Jain	Physio
105	Gita Vijay	Ortho

Table : Patients

PatNo	PatName	Department	DocID

1	Payal	ENT	102
2	Naveen	Ortho	101
3	Rakesh	Neuro	103
4	Atul	Physio	104
5	Rahul	Ortho	105

Write queries for the following:

1. Display the Doctor name of Payal
2. Display the doctors and patients in Ortho department
3. Display the number of patients in each department

OR

Write output for the following queries:

1. Select DocName,PatName from Doctors D, Patients P where D.DocID=P.DocID;
2. Select DocName from Doctors order by Department;
3. Select D.DocID, DocName, PatName from Doctors D, Patients P where D.DocID=P.DocID and D.DocID=103;

9. **Consider the table EMP:**

EmpID	FirstName	LastName	Department	Salary
M1000	Irene	Baker	IT	12076.25
M1003	Louis	Lennerton	Sales	6990.00
M1009	Nicholas	North	Finance	2350.25
M1038	Patricia	Parsley	Finance	14000.00
M1043	Priscilla	Parks	IT	4998.75
M1053	Regina	Smith	Sales	6800.25
M1064	Samuel	Sanders	IT	7525.25

Write queries for the following:

1. Display the employees in the descending order of salary
2. Display the average salary of employees in each department
3. Display the department and average salary of each department where the average salary is more than 8000
4. Display Department and number of employees in each department
5. Display the details in alphabetical order of department and within that in alphabetical order of First name.

10. **Table: TECH_COURSE**

CID	CNAME	FEES	STARTDATE	TID
C201	Animation and VFX	12000	7/2/2022	101
C202	CADD	15000	11/15/2021	NULL
C203	DCA	10000	10/1/2020	102
C204	DDTP	9000	9/15/2021	104
C205	App Development	18000	2022-11-01	101
C206	Digital marketing	16000	7/25/2022	103

Table : CENTRE

TID	CITY
101	KANNUR
102	CALICUT
104	THRISSUR
105	ERNAKULAM
103	TRIVANDRUM

Write output for the following queries:

a) Select tid, count(*), min(fees) fromtech_coursegroupbytidhaving count(tid)>1;
b) Select cname from tech_coursewherefees>15000orderbycname;
c) Selectavg(fees)fromtech_coursewhere feesbetween15000and17000;
d) Select CNAME, CITY from tech_course, centre where tech_course.tid=centre.tid;
e) Select centre.TID,sum(fees) from tech_course, centre where tech_course.tid=centre.tid group by centre.TID;

11. What is Group By clause?
12. Can a Group by clause be used for more than one column? If yes, given an example.

ANSWERS

1. Select dept, count(empno) from emp group by dept having count(empno)>10;
2. where , group by, having
3. The column dname will not give a correct value as it has multiple values in each group
4. Round()
5. A is False but R is True
6. 1. select singer,avg(cost) from music group by singer;
   2. select album,count(*) from music group by album;
   3. select album,sum(quantity) from music group by album having sum(quantity)>10;

OR

Album	count(quantity)
black	1
ibadat	2
kismat	1
madhushala	1
saher	2

2.

```
sum(cost)
+-----------+
|      150 |
|      150 |
|      250 |
|      220 |
|      540 |
|      250 |
```

3

```
| cost*quantity |
+---------------+
|          1440 |
|          1080 |
|           540 |
|           300 |
+---------------+
```

7

a. Select NAME , PRICE from ITEM order by PRICE desc;
b. Select CODE, NAME from ITEM order by CODE;
c. Select * from ITEM order by PRICE desc , NAME;

8.

1. Select DocName from Doctors D,Patients P where D.DocID=P.DocID and PatName='Payal';
2. Select DocName, PatName from Doctors D,Patients P where D.DocID=P.DocID and D.Department='Ortho';
3. Select Department,count(PatName) from Patients group by Department;

OR

1.

DocName	**PatName**
Mahesh tripathi	Payal
J K Mishra	Naveen
Ravi Kumar	Rakesh
Mukesh Jain	Atul
Gita Vijay	Rahul

2.

DocName
Mahesh tripathi
Ravi Kumar
J K Mishra
Gita Vijay
Mukesh Jain

3.

DocID	DocName	PatName
103	Ravi Kumar	Rakesh

9.

1. Select FirstName,Salary from EMP order by Salary desc;
2. Select Department,avg(Salary) from EMP group by Department;
3. Select Department,avg(Salary) from EMP group by Department having avg(Salary)>8000;
4. Select Department, count(*) from EMP group byDepartment;
5. Select * from EMP order by Department , FirstName;

10.

a.

tid	count(*)	min(fees)
101	2	12000

b.

cname
App Development
Digital Marketing

c.

avg(fees)
15500

d.

CNAME	CITY
Animation and VFX	KANNUR
DCA	CALICUT
DDTP	THRISSUR
App Development	KANNUR
Digital Marketing	TRIVANDRUM

e.

TID	sum(fees)
101	30000
102	10000
103	16000
104	9000

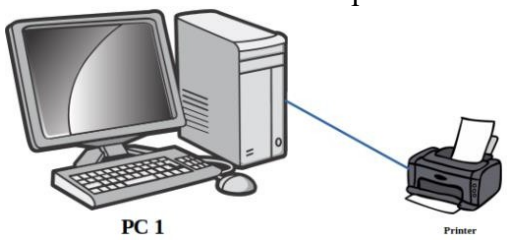
11 The GROUP BY Clause is utilized in SQL with the SELECT statement to organize similar data into groups. It combines the multiple records in single or more columns using some functions. Generally, these functions are aggregate functions such as min(), max(), avg(), count(), and sum() to combine into single or multiple columns.

12 Yes.
Select name, grade, class From student
Group by Class, grade

UNIT-III

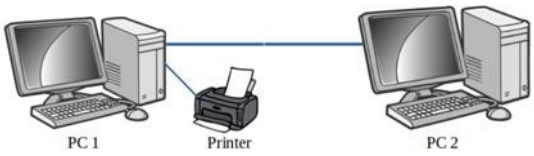
Introduction to Computer Networks

Consider a stand alone computer connected to a printer.



This computer is useful for a particular person at a time. Every time we need to access the files from this PC the user needs to personally sit by it and work.

Concept of networking – Interconnection of Computers



Two or more autonomous computing device connected to one another in order to exchange information or resources form a computer network.

Advantages of using computer networks

Advantages of using computer networks

- **Resource sharing**:-Resource sharing makes it possible to use resources economically, for example, to manage peripheral devices, such as laser printers, from all connected systems.
- **Data separation** :-Data separation provides the ability to access and manage databases from peripheral workstations that need information
- **Separation of software tools**:- The separation of software tools provides the possibility of simultaneous use of centralized, previously installed software tools.
- **CPU resource sharing:**- With the separation of processor resources, it is possible to use computing power for data processing by other systems that are part of the network.
- **Multiuser mode:-**The multi-user properties of the system facilitate the simultaneous use of centralized application software tools previously installed and managed, for example, if the user of the system is working with another task, then the current work performed is pushed into the background.

Where to connect the network cable while networking and form of cabling

Thenetworkcableisconnectedtoa RJ-45connector(RJ –RegisteredJack

RJ 45 with network cable attached

Network port

Network cable connected to port

Evolution of Computer Network - Types of computer network:

There is no single system that satisfies all computer networks. For classification, specific characteristics are distinguished that allow the networks to be divided into separate types.

The following is the different types of network based on size of computer networks:

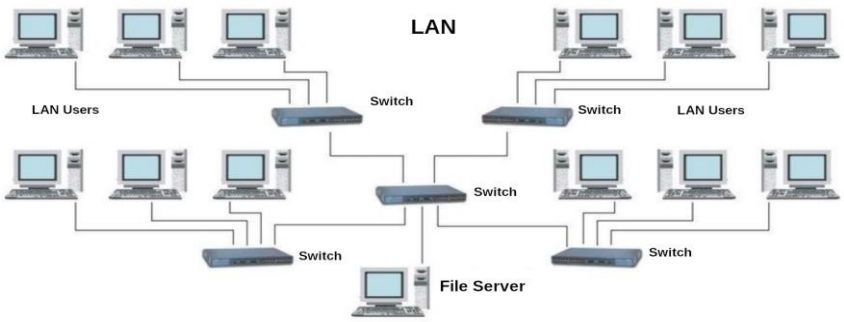
PAN

A Personal Area Network (PAN) allows devices to exchange data over short distances. PAN combines devices such as mice, keyboards, printers, smartphones, tablets, etc. The most common connection technology is Bluetooth. Bluetooth can give a range of upto 10metres.

LAN

A Local Area Network (LAN) is a computer network that, as a rule, covers a small area, located in one or more buildings

The term "local" in this context refers to joint local management (does not mean the mandatory physical proximity of components to each other). A local network can be a home network, a combination of computers and other devices of a small office or a large enterprise.



Wired connections are widely used in LAN, most of which are made using copper wires, and some are fiber—optic. Usually, wired networks operate at speeds from 100 Mbit/s to 1

Gbit/s. More modern LAN can operate at a speed of10 Gbit/s. The most common wired connection standard is the IEEE 802.3 standard, commonly referred to as Ethernet.

In local area networks, along with wired technologies, wireless connections according to the IEEE 802.11 standard, better known as Wi-Fi, are widely used.

Wireless Wi-Fi networks operate at speeds from several to hundreds of megabits per second. The size of LAN networks ranges from 10metres to 1 Km

MAN

Metropolitan area network(MAN) unite computers within a city. As an example, we can consider a cable television system in which it became possible to transmit digital data and, over time, the system turned into a computer network**.**

WAN

The Wide Area Network(WAN) covers significant territories, connects local networks that can be located ingeographically remote areas. A global network is similar to a large wired local area network, but there are important differences:

- management of local networks and provision of access to the inter-network data transmission environment is carried out by various organizations;
- networks using different types of network technologies can be connected;
- with the help of communication channels, individual computers can communicate with local networks, or entire networks.

The Internet can be considered as a WAN. A WAN ranges from 100km to 10000km**..**

Networkdevices

We cannot always make sure that there is a dedicated connection from one computer to another one in a computer network. Further the data travels over the telephone network. Hence there arises the need for different types of devices in computer networks. **Network devices provide transportation of data that needs to be transferred between end-user devices.** They extend and combine cable connections, convert data from one format to another, and control data transmission. Examples of devices that perform these functions are repeaters, hubs, switches and routers.

.

Networkcard(NIC/NIU/TAP)

The devices that connect the end user to the network are also called terminal nodes. An example of such devices is an ordinary personal computer. To work on the network, each host is equipped with a **network Interface card** (NIC), also called a network adapter. As a rule, such devices can function without acomputer network.

A network adapter is a printed circuit board that is inserted into a slot on the motherboard of a computer, or an external device. Each NIC adapter has a unique code called a **MAC address**. This address is used to organize the operation of these devices on the network.

Repeater

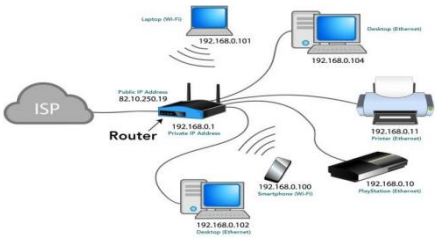
The purpose of using a repeater is to regenerate and resynchronize network signals, which allows them to be transmitted over a longer distance through the medium.

Hub

Hub is a network device used to combine devices. The hub can have from 8 to 32 ports for connecting computers. All the information that comes to the connector of one port will be copied automatically and sent to ALL other ports. The simplest hub is a multiport repeater..

Router

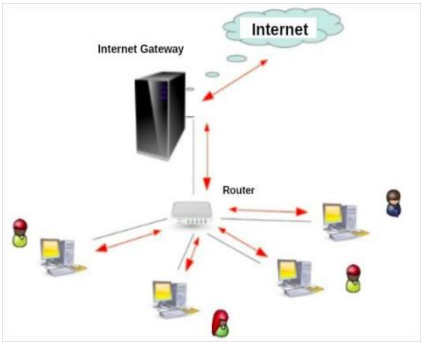
A router is a device that connects two or more packet-switched networks or subnetworks.



Gateway

A gateway is considered as a network device that acts as an entry point from one network to another. Themain task of a network gateway is to convert protocol (rules for communication over the data network) between networks.

A gateway is a network node used in telecommunications that connects two networks with different transmission protocols together



Switch

A switch is used to connect computers, laptops and other devices to a shared local network.

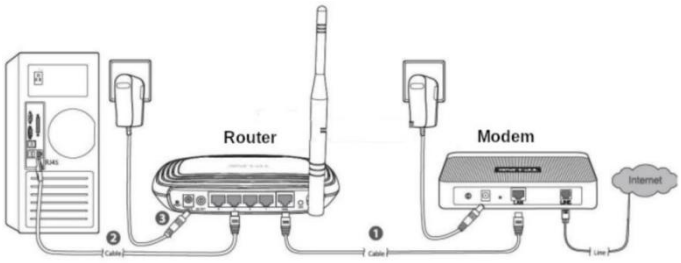
Switch at home

Switch is also a network device used to connect multiple devices together like Hub. But the difference between the hub and switch is that hub forward the received messages to all the connecting devices and switch forward the message to the intended device only. So switch is known as the intelligent device.

Modem - modulator/demodulator

A modem is a device that converts a digital signal into an analog signal and vice versa. The modem connects the user's computer or laptop to the Internet. It works in two directionsat once:

- Receives a digital signal from a PC, converts it to analog (in the form of a wave)and transmits the request to the servers storing the necessary information;
- Receives the response to the sent request in analog form, converts it to digital and transmits it to the PC



Connection of a Modem with Router

NetworkingTopologies:

Topologies: The arrangement of computers and other peripherals in a network is called its topology.Common network topologies are **bus, star mesh, and tree.**

Bus Topology

In bus topology all the nodes are connected to a main cable called backbone. If any node has to send some information to any other node, it sends the signal to the backbone. The signal travels through the entire length of the backbone and is received by the node for

which it is intended. A small device called terminator is attached at each end of the backbone. When the signal reaches the end of backbone, it is absorbed by the terminator and the backbone gets free to carry another signal.
.

Characteristics of Bus topology:

- ✓ It is easy to install.
- ✓ It requires less cable length
- ✓ It is cost effective.
- ✓ Failure of a node does not affect the network.
- ✓ Fault diagnosis is difficult.
- ✓ At a time only one node can transmit data.

Star Topology:

In star topology each node is directly connected to a hub/switch. Star topology generally requires morecable than bus topology.

Characteristics of Star topology:

- It is more efficient topology
- It is easy to install
- It is easy to diagnose the fault
- It is easy to expand
- Failure of hub/switch leads to failure of entire network
- It requires more cable length

Tree Topology:

Tree topology is a combination of bus and star topologies. It is used to combine multiple star topologynetworks. All the stars are connected together like a bus.

Characteristics of Tree topology:

- It offers easy way of network expansion.
- If one network (star) fails, the other networks remain connected and working.

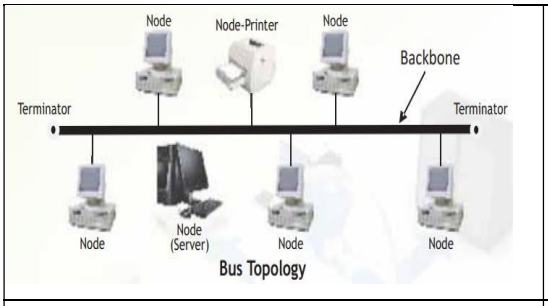
Mesh Topology :

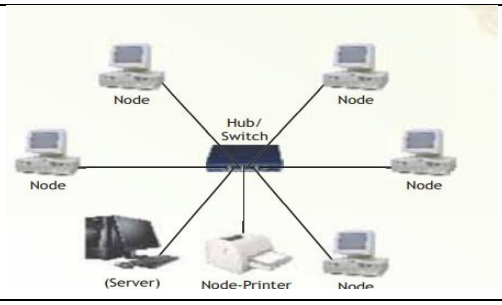
In this networking topology, each communicating device is connected with every other device in thenetwork. To build a fully connected mesh topology of n nodes, requires n(n-1)/2 wires.

Characteristics of Mesh topology:

- Failure during a single device won't break the network.
- There is no traffic problem.
- It provides high privacy and security.
- A mesh doesn't have a centralized authority.
- It's costly.
- Installation is difficult

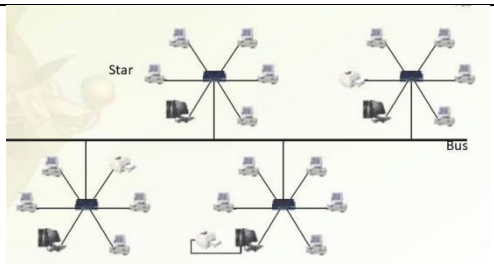
BUS	STAR

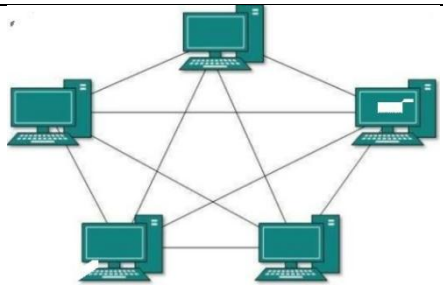




TREE

MESH





Introduction to Internet:

The Internet is the global network of computing devices including desktop, laptop, servers, tablets, mobile phones, other handheld devices as well as peripheral devices such as printers, scanners, etc. In addition, it consists of networking devices such as routers, switches, gateways, etc. Today, smart electronic appliances like TV, AC, refrigerator, fan, light, etc., can also communicate through the Internet.

Applications of Internet

- The World Wide Web (WWW)
- Electronic mail (Email)
- Chat
- Voice Over Internet Protocol (VoIP)

The World Wide Web (WWW): The World Wide Web (WWW) or web is information stored in interlinked web pages and web resources. The resources on the web can be shared or accessed through the Internet. Three fundamental technologies HTML,URL and HTTP leads to creation of web.

URL : A Uniform Resource Locator (URL) is a standard naming convention used for accessing resources over the Internet. URL is sometimes also called a web address. In below URL, http is the protocol name, it can be https, http, FTP, Telnet, etc. www is a sub domain. ncert.nic.in is the domain name

Electronic mail (Email) : Electronic mail is a means of sending and receiving message(s) through the Internet. The message can be either text entered directly onto the email application or an attached file (text, image audio, video, etc.) stored on a secondary storage. To use email service, one needs to register with an email service provider by creating a mail account.

Chat : Chatting or Instant Messaging (IM) is communicating in real time using text message(s).

Voice Over Internet Protocol (VoIP): Voice over Internet Protocol (VoIP) allows you to have voicecalls over digital networks.

Points To Remember :

- ★ In Bus topology Nodes connected using single wire, cost effective, easy to install and fault diagnoseis difficult.
- ★ In star topology each Nodes is directly connected to hub/switch easy to install, expensive and easyto diagnose faults.
- ★ Tree is combination of star and bus.
- ★ Mesh topology each device is connected to every other device. No centralized device, andexpensive
- ★ WWW (World Wide Web)where documents and other web resources are identified by UniformResource Locator.
- ★ URL is a reference to a web resource that specifies its location on a computer network and a mechanism for retrieving it.
- ★ Chat is real time texting.
- ★ VoIP allows voice calls.

REVISION QUESTIONS

1.	Television cable network is an example of: i. LAN ii. WAN iii. MAN iv. Internet
2.	Which device is used to regenerate the signals over long distance data transmission: i. Switch ii. Modem iii. Repeater iv. None of the above
3.	Which protocol allow us to have voice calls over the internet? i. HTTP ii. VoIP iii. Video Chat iv. SMTP

4.	1. A computer network created by connecting the computers of your school's computer lab is an example of i. LAN ii. MAN iii. WAN **iv.** PAN
5.	Mention any four networking goals.
6.	Compare and contrast – STAR and BUS topologies
7.	What do you mean by URL? Explain in short with its elements.
8.	ASSERTION AND REASONING based questions. Mark the correct choice as (A) Both A and R are true and R is the correct explanation for A (B) Both A and R are true and R is not the correct explanation for A (C) A is True but R is False (D) A is false but R is True **Assertion (A)**: Each website has a unique address called URL. **Reasoning (R)**: It is Unified Resource Locator and a correct example is www.ncert.nic.in

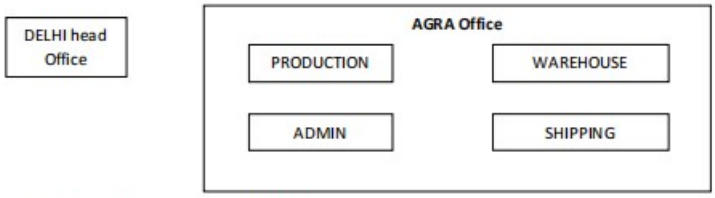
ANSWERS

1.	iiiMAN
2.	iii. Repeater
3.	.ii. VoIP
4	i. LAN
5.	● **Resource Sharing** The main goal of the computer network is Resource Sharing. It is to create all the programs, data and hardware accessible to anyone on the network without considering the resource's physical area and the client. ● **Cost Effective** The second goal of a computer network is saving money. Small computers have a much excellent value proportion than higher ones. ● **High Reliability** The third goal is to support high reliability by acquiring a different authority of supply. For example, all files can be recreated on a few machines, and thus if one of them is nonexistent, the additional copies could be available. ● **Improve Performance** The fourth goal of a computer network is to improve accessibility and the performance of the system. A system's performance can be improved by inserting one or more processors into it as its workload grows. For example, if the system is full, replacing it with a larger one at a large expense, it is better to add more processors to it at less cost and less disruption to the user. This improves both accessibility as well as the performance of a

	system. ● **Communication Medium** The fifth goal of the computer network offers a powerful communication medium. The different user on the network can immediately identify a document that has been refreshed on a network
6.	<table><tr><th>STAR Topology</th><th>BUS Topology</th></tr><tr><td>Star topology is a topology in which all devices are connected to a central hub</td><td>Bus topology is a topology where each device is connected to a single cable which is known as the backbone.</td></tr><tr><td>In star topology, if the central hub fails then the whole network fails.</td><td>In a Bus topology, the failure of the network cable will cause the whole network to fail.</td></tr></table> 2 mark for any 2 correct differences or other relevant difference
7.	A URL (Uniform Resource Locator) is a unique identifier used to locate a resource on the Internet. It is also referred to as a web address. URLs consist of multiple parts -- including a protocol and domain name -- that tell a web browser how and where to retrieve a resource.
8.	(C) A is True but R is False

NETWORK CASE STUDY QUESTIONS

1.	Agra Shoes Pvt. Limited is an international shoe maker organization. It is planning to set up its India Office at Agra with its head office in Delhi. The Agra office campus has four main buildings - ADMIN, PRODUCTION, WAREHOUSE and SHIPPING. You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (v), keeping in mind the distances between the buildings and other given parameters.



Shortest distances between various buildings:

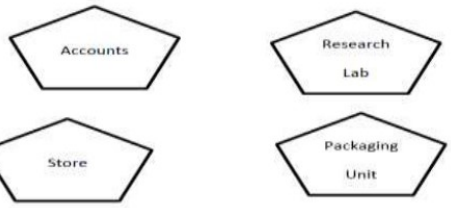
ADMIN to WAREHOUSE	50 Mtr
ADMIN to PRODUCTION	85 Mtr
ADMIN to SHIPPING	45 Mtr
WAREHOUSE to PRODUCTION	50 Mtr
WAREHOUSE to SHIPPING	45 Mtr
PRODUCTION to SHIPPING	40 Mtr
DELHI head office to AGRA Office	240 Km

Number of computers installed at various buildings are as follows:

ADMIN	120
WAREHOUSE	60
PRODUCTION	35
SHIPPING	18
Delhi Head Office	12

i) Suggest the most appropriate location of the server inside the AGRA Office (out of the four buildings) to get the best connectivity for maximum number of computers. Justify your answer.
ii) Suggest and draw cable layout to efficiently connect various buildings within the AGRA Office for a wired connectivity.
iii) Which networking device will you suggest to be procured by the company to interconnect all the computers of various buildings of AGRA Office?
iv) Company is planning to get its website designed which will allow shopkeepers to see their products, shipping details themselves on its server. Out of the static or dynamic, which type of website will you suggest?
v) Which of the following will you suggest to establish the online face to face communication between the people in the ADMIN office of AGRA and Delhi head office?
A) Cable TV B) Email (C) Video conferencing (D) Text chat

2.	SHARMA Medicos Center has set up its new center in Delhi . It has four buildings as shown in the diagram given below



Distance between various building are as follows:

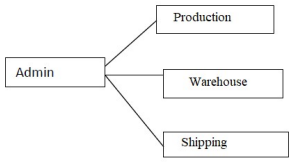
Accounts to research Lab	55m
Accounts to store	150m
Store to packaging unit	160m
Packaging unit to research lab	60m
Accounts to packaging unit	125m
Store to research lab	180m

Number of Computers

Accounts	25
Research Lab	100
Store	15
Packaging Unit	60

As a network expert, provide the best possible answer for the following queries:
i. Suggest a cable layout of connections between the buildings.
ii. Suggest the most suitable place (i.e. buildings) to house the server of this organization.
iii. Suggest the placement of the following device with justification:
a) Repeater b) Hub/Switch
iv. Suggest a system (hardware/software) to prevent unauthorized access to or from the network.
v. The company is planning to link its head office situated in Delhi with the offices in hilly areas. Suggest a way to connect it economically

NETWORK CASE STUDY QUESTION- ANSWER

1	i) Server should be installed at ADMIN as it has maximum numbers of computers  ii) Star Topology iii) Hub/ Switch iv) Dynamic v) (C) Video conferencing
2	i. 1 mark for correct layout ii. Research Lab iii. Repeater: Between Accounts and Store, Hub/Switch in each block iv. Firewall v. Radio Wave

WEB BASED QUESTIONS

1.	____ is a collection of related web pages.
2.	Differentiate Website and web page
3.	Differentiate Static and Dynamic web pages
4.	Differentiate web server and web hosting
5.	Give any three applications on the Internet.
6.	Name any two mail service providers.
7.	What are plugins ?
8.	What are addons ?
9.	What are cookies ?
10.	Ruhani wants to edit some privacy settings of her browser. How can she accomplish her task?
11.	Shubham wants to play a video in his browser but he is not able to do so. A message on the screen instructs him to install the Adobe Flash Player plugin. Help him to add it in his browser.

ANSWERS		
1	Website	
2.	**Website:** A website is a collection of related web pages. The website contains various elements and links to other web pages	**Web page:** A web page is a document that is viewed in a web browser such as Google Chrome, Mozilla Firefox, Opera, Internet Explorer, etc. It can be static or dynamic. Web Page is a part of any website.
3.	**static web page:** A static web page is one whose content does not change for requests made by different people. In static web pages, the content and layout of the web page are fixed. It can be created using HTML	**dynamic web page:** A dynamic web page is one in which the content of the web page displayed is different for different users. In dynamic web pages, the content and layout of the web page may vary according to the time the web page loaded. Dynamic web pages can be created using PHP, ASP, JSP etc.
4.	**web server :** A web server is a program or a computer that provides services to other programs or computers called clients.	**Web hosting :** Web hosting is a service that allows you to post the website created locally so that it is available for all internet users across the globe.
5.	Chat Email VoIP	
6.	Google – gmail Yahoo – yahoo mail Rediff – rediff mail	

7.	**Plug-ins** Plug-ins are the tools that help to extend and modify the functionality of the browser. A plug-in is a complete program or may be a third-party software. For example, Flash and Java are plug-ins. A Flash player is required to play a video in the browser. A plug-in is a software that is installed on the host computer and can be used by the browser for multiple functionalities and can even be used by other applications as well.
8.	**Add-ons** Add-ons are the tools that help to extend and modify the functionality of the browser. On the other hand, an add-on is not a complete program and so is used to add only a particular functionality to the browser. An add-on is also referred to as an extension in some browsers. Adding the functionality of a sound and graphics card is an example of an add-on.
9.	A **cookies** is a text file containing a string of information which stores browsing information on the hard disk of your computer. It helps in customizing the information that will be displayed, for example the choice of language for browsing, allowing the user to auto login, remembering the shopping preference, displaying advertisements of one's interest, etc.
10	Open browser ● From the right corner choose the settings option from a dropdown. ● From there choose the "Privacy and security" tab from the left panel. ● Once you click, it will show all the options concerned to it.
11	To add plug-ins, click Plug-ins options on the left side of the browser window. Make the desired selections to enable or disable the required plug-ins

Societal Impacts

Digital footprint are the records and traces of individuals' activities as they use the internet. Digital footprints are permanently stored. Digital footprints are get created actively and passively. An active digital footprint includes data that you intentionally submit online. A passive foot print created through your data trail that you unintentionally leave online.

Example for Active footprint are sending an email, sending messages online, posting a social media post, replying to posts etc.

Example for passive digital footprint are, when you visit a website , the web server may log your IP address , which identifies your internet service provider and your approximate location.

Managing Digital Footprint

1. Know what your digital footprint is. Look at all the social networking sites and forums that you belong to, and search your name to know what information about you is available.
2. E-behave responsibly.
3. Keep your digital footprint clean.
   (a) Remove any photos, content and links that may be inappropriate.
   (b) Remove any details about you that reveal too much information like your phone number, address, school or college name
4. Control the visibility of your information.
5. Think before you post

Netiquettes- Net and communication Etiquettes

It refers to online manners while using internet or working online. While online you should be courteous, truthful and respectful of others. Basic rules of netiquettes are,

1. Refrain from personal abuse.
2. Never spam- Don't repeatedly post the same advertisement for products or services.
3. Always post correct contents in respectful language.
4. Do not post copyrighted material to which you do not own the right.
5. In discussion forum, stick to the topic.

Email Etiquettes.

1. Be concise and to the point.
2. Use proper spelling, grammar and punctuations.
3. Use proper structure and layouts.
4. Do not write in CAPITALS. It seems as if you are SHOUTING.
5. Handle abbreviations and emotions with care.
6. Gender sensitivity.

Ethical Issues

The following are the ethical issues involved with the usage and availability of information.

1.Intellectual property rights: -

Intellectual property refers to the creation of mind such as innovations, Literary works, artistic works, design, symbols name and images in commerce.

Intellectual property rights are the rights of owner of information to decide how much information to be exchanged, shared or distributed. Also it gives the owner a right to decide price for doing (exchanging / sharing / distributing)

The creator/ producer of the information are the real owner of the information. And has every right to protect his/ her intellectual property. To protect one's intellectual property rights one can get information copyrighted, patented or use trademarks.

Copyright

A copyright is a collection of rights automatically vested to someone who has created an original work. He has the authority to keep or to transfer the rights to use or distribute, individually to one or more people.

Copyright infringement is the use or production of copyright protected materials without the permission of the copyright holder.

Patent: - It is the grant of exclusive right to the inventor by the government. Patent give the holder a right to exclude others from making, selling, using or importing a particular product or services.

Trademark:-A trademark is the word, phrase, symbol, sound, colour or design that identifies and distinguishes the products and goods of one party from others.

Digital property: - It refers to any information about you or created by you that exists in digital form, either online or in an electronic storage device.

II. Digital Property Rights: - Digital Property Rights refers to rights that grant access and control of digital information. • Legally a person who has created it or the owner who has got it developed by paying legally is the legal owner of a digital property. Only owner can use and decide who all and in what form can his/her asset may be used by others.

Threats to digital property

1. Digital Software penetration rule: - There are many software penetration tools such as cracks, keygens, tools created by hackers to penetrate your software's registration system and enable unauthorized users to freely access your software.
2. Stealing and plagiarizing code of your digital properties: - Sometime other developers somehow get hold of your software's source code and then create plagiarized version of your code and use it in their own software.

Digital property right protection

1. Anti-Temper solutions: - The anti-temper solutions use a host of advanced technologies to prevent hackers from hacking, reverse – engineering or manipulating your digital properties
2. Legal clauses: - You must include a transparent clause in your software's Terms of Service that prohibits the scraping of your software's source code for reuse.
3. Limit the sharing of the software codes.

Plagiarism

Plagiarism is the stealing someone else's intellectual work and representing it as your work without citing the source of information.

Examples:-

- ✓ Using some other author's work without giving credit to the author.
- ✓ Using someone else's work in incorrect form that intended originally by the author.
- ✓ Modifying / Lifting someone's production such as music composition without attributing to the creator of the work.
- ✓ Giving incorrect source of information ie wrongful citation

Open source Philosophy

Open source software refers to those categories of software whose licenses do not impose much conditions. Such software generally gives users freedom to run/use the software for any purpose.

Terminology

1. Free software
2. Open source software.

Free software means the software, freely accessible and can be freely used, changed, improved, copied and distributed by all who wish to do so. And no payments need to be made for free software.

Open source Software

Open Source Software can be freely used but it does not have to be free of charge.

A software which is free as well as open belongs to the category FOSS – Free and Open Source Software

Terminology pertaining to open source software.

OSS- Open Source software

FLOSS- Free Libre and open source software

FSF- Free Software Foundation

GNU- GNU's Not Unix

OSI- Open Source Initiative

W3C- World Wide Web Consortium.

Proprietary Software: - It is the software that is neither open nor freely available.

Freeware:- The term freeware is generally used for software which is available free of cost and which allows copying and further distribution, but not modification and whose source code is not available.

Shareware:- It is the software, which is made available with the right to redistribute copies , but it is stipulated that if one intends to use the software after certain period of time, then license fee should be paid. Source code is not available with Shareware and modification of the software is not allowed.

Copyright and other Licenses

License are the permissions given to use a product or someone's creation by the copyright holder.

Copyright:Copyright is a legal term to describe the rights of the creator of an original creative work such as a literary work, an artistic work, a design, song, movie or software etc,

As per open source initiative, Open source licences are the licenses that comply with the Open Source Definition.

Broadly used open source licenses are given below.

1. GNU General Public License (GPL)
   No limit to Copying the code of the software. You can copy it on your server, on client's server, local workstation as many times as you want.
   Can be distributed in whatever form we want.
   Charge a fee. You can charge someone for the software.
2. Apache License.
   Rights are Never –ending: Once the rights have been granted, you can continue to use them forever. No need to renew.
   Worldwide Authority of Rights: Rights granted to one country will be considered as granted to all countries.
   Rights for No Fee or Royalty: No charges are applicable in any form
3. GNUs Lesser General public License (LGPL)
   It offers lesser rights to a work than the standard GPL license. The LGPL is used to license free software so that it can be incorporate into both free software and proprietary

Cyber crime

Any criminal offense that facilitated, or involves the electronic communication or information systems, including any electronic device, computer or the internet is referred as Cyber Crime

Hacking

Hacking refers to gaining unauthorized access to a network or computer or digital files, with an intension to steal or manipulate data or information or to install malwares.

Phishing

Phishing is the practice of attempting to acquire sensitive information from individuals over the internet, by means of deception.

Cyber Bullying

Harassing, defaming or intimidating someone using modern technology like Internet, cell phones, instant messengers, social networks etc is called Cyber Bullying.

Cyber Law and IT act.

Cyber law is the term which refers to all legal and regulatory aspects of Internet and World Wide Web.

India's IT Act and IT(Amendment) Act, 2008

In India the cyber laws are enforced through Information Technology Act 2000(IT Act 2000) which was notified on 17th October 2000.The Act was later amended in December 2008.

E-waste Management

Electronics waste, e-Waste or Waste Electrical and Electronic Equipment describes discarded electrical or electronic devices like computer, mobile phones, television sets, refrigerator etc.

E-waste has the characteristics

(a) The fastest growing segment of waste.
(b) Most valuable due to its basic composition.
(c) Very hazardous if not handled properly.

E-Waste disposal Process

1. Dismantling: - Removal of parts containing dangerous substances, removal of easily accessible parts containing valuable substances.
2. Segregation of ferrous metal, non-ferrous metal and plastic
3. Refurbishment and reuse.
4. Recycling/ recovery of valuable materials
5. Treatment/ disposal of dangerous materials and waste

Benefits of e-waste recycling

1. Allows for recovery of valuable precious metals.
2. Protects public health and water quality
3. Creates jobs

4. Toxic waste
5. Save landfill space.

Health concerns with Technology usage.

1. Impact on hearing
2. Impact on Bones and Joints
3. Eye problem
4. Sleep Issues
5. Mental health issues. (Internet addiction disorder)

A Repetitive Strain Injury(RSI) is an injury or disorder of the muscles, nerves, tendons, ligaments and joints.

Computer Vision Syndrome(CVS) is a technology related health condition affecting eyesight.

When a person can't find a balance between their time online and their time offline, it considerably affect the mental health. This condition is called Internet Addiction Disorder (IAD).

REVISION QUESTIONS

1.	Data which has no restriction of usage and is freely available to everyone under Intellectual Property Rights is categorized as (a) Open Source (b) Open data (c)Open Content (d) Open Education.
2.	Technology not protected by copyright and available to everyone, is categorized as (a) Proprietary (b) Open Source (c) Experimental (d) Shareware
3.	Which of the following is not a cyber crime? (a) Data theft (b) Forgery (c) Damage to data and system (d) Installing anti-virus software
4.	Out of the following which crime will come under Cyber Crime category (a) Identity Theft (b) Invasion of privacy (c) Online Harassment (d) All of the above.
5.	Gaining unauthorized access to a network or computer or digital files with malicious intension is _____ (a) Cracking (b) Hacking (c) Banging (d) Phishing
6.	Legal term to describe the rights of a creator of original creative or artistic work is called_____ (a)Copyright (b)Copyleft (c) GPL (d) None of the above.
7.	The following is automatically granted to the creator or owner of any invention. (a) Patents (b) Copyright (c) Trademark (d) License

8.	Companies get their Trademark registered to the projects: (a)Logos, names and brands (b) word, phrase or symbols (c) Slogan, Stylized fonts and colours (d)Company furniture, workers, brands
9	GPL stands for _____ (a) Guided Public License (b) General Public License (c) Global Public License (d) General Public Letter
10	The primary law in India dealing with cyber crime and electronic commerce is: (a) India's Technology(IT) Act 2008 (b) India's Digital Information Technology (DIT) Act 2000 (c) India's Information Technology Act, 2000 (d) The Technology Act 2000

	ASSERTIONS AND REASONS
11	In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as: (a) Both A and R are True and R is the correct explanation of A. (b) Both A and R are true but R is not correct explanation of A. (c) A is True but R is False. (d) A is false but R is True
12	Assertion: The trail of online activity is called Digital footprint Reason: Digital footprint are the records of online activity of an individual.
13	Assertion: The patents are available online. Reason: Patents are the grant of exclusive right(s) of an invention
14	Assertion: Anything available online does not mean it is free and freely available to use Reason: IPRs do not apply on the online content.
15	Assertion: Freeware and Free software are same. Reason: Free software may be chargeable.
16	Assertion: Plagiarism is an offence. Reason: Stealing someone's work and showing it as own work is the violation of Intellectual Property Rights

SAMPLE PAPER

KENDRIYA VIDYALAYA SANGATHAN- ERNAKULAM REGION
INFORMATICS PRACTICES (065)

TIME: 03 HOURS …….. Total Marks-70

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A has 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 02 questions carrying 04 marks each.
7. Section E has 03 questions carrying 05 marks each.
8. All programming questions are to be answered using Python Language only.

SECTION-A

1	Identify the device that receives data from telephone lines and converting it to make it compatible for PCs. i. Hub ii. Modem iii. Gateway iv. Repeater	1
2	Electronic equipments contain many hazardous metallic contaminants. Identify the chemical that damages central and peripheral nervous systems, blood systems, and kidney damage. Also produces adverse effects on brain development of children; causes damage to the circulatory system and kidney. a) Cadmium b) Beryllium c) Lead d) Nickel	1
3	Legal term to describe the right of creator of original creative or artistic work is called_____. a. Copyright b. Copyleft c. GPL d. Trademark	1
4	Consider the table: Table: Company SID | SALES S101 | 20000 S103 | NULL S104 | 10000 S105 | 15000 What output will be displayed by the following SQL statement? SELECT AVG(SALES) FROM Company;	1

5	Which of the following is not a scalar function in SQL. i. POWER() ii. COUNT() iii. LENGTH() iv. MOD()	1
6	_____ is not a FOSS tool. i. Libre Office ii. Mozilla Firefox iii. Google Chrome iv. Python	1
7	The main advantage of CSV file is that a) A file that contains data, separated by commas, is saved in a tabular format b) Helps smooth data export and import into other programs c) Data can be edited using commonly used softwares like wordpad, excel etc. d) All of the above	1
8	Charvi is inserting "Sharma" in the "LastName" column of the "Emp" table but an error is being displayed. Write the correct SQL statement. INSERT INTO Emp('Sharma') VALUES (Lastname) ;	1
9	Consider the following SQL query. **select day('2023-07-21');** The above query produced 21 as output. What is the meaning of output 21. a). Shows the importance of the date 21 b) Total number of days of a month c)Represents the day (day of the month) of the specified date d) Wrong output	1
10	Balu has written following code to get the last five records from Series object S, but he is not getting the correct output. **print(s.bottom(5))** Help him by selecting an appropriate option from the following to get his desired result? a) s.last() b) s.trail() c) s.tail() d) s.end()	1
11	Identify the clause that checks condition on **a group of rows in SQL**. They are used along with aggregate functions. a) Group by b) Having c) Order by d) Where	1
12	Consider the following statement LoD = [{'a':10, 'b':20}, {'a':5, 'b':10, 'c':20},{'a':7, 'd':10, 'c':20}] d=pd.DataFrame(LoD)	1

	print(df.shape) What will be the output of above print statement. a) (3,4) b) (4,3) c) [3,4] d) [4,3]	
13	A fraudulent SMS, social media message, voice mail, or other in-app message asks the recipient to update their account details, change their password, or tell them their account has been violated. The message includes a link used to steal the victim's personal information or install malware on the mobile device. This kind of attack is known as: i. Mobile Phishing ii. Identity Theft iii. Plagiarism iv. Ransomware	1
14	Which function In SQL, we can use similarly as substr() or substring() ? a) instr() b) mid() c) middle() d) between()	1
15	Name the piece of text that a website remembers about the websites we had visited, also makes it easier to visit the site again and make the site more useful to us. i. Plug-ins ii. add-ons iii. Server iv. Cookies	1
16	The…… are legal tools that provide a simple, standardized way to give the public permission to share and use creative work—on conditions of the owner's choice. i. Creative Commons licenses ii. Charge couple Device iii. Open Source iv. Free Libre	1
17	Assertion (A)**: Each website has a unique address called URL.** Reasoning (R)**: It is Unified Resource Locator and a correct example is** http://mypage.htm/google.com i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True	1

18	Assertion (A)**: DataFrame has both a row and column index.** Reasoning (R)**: .loc() is a label based data selecting method to select a specific row(s) or column(s) which we want to select.** i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True	1
	SECTION-B	
19	Briefly explain the basic concepts of a web browser and web server.	**2**
20	The python code written below has syntactical errors. Rewrite the correct code and underline the corrections made. import panda as pd devices={'Product': pd.series(['Keyboard','Mouse','Printer','Speaker'],index=[11,22,33,44]), 'Prices': pd.series([400,300,8000,450],index=[11,22,33,44])} rdf = pd.Data Frame(devices) Print(rdf)	**2**
21	Consider the given SQL string: **"Plant a tree , and save the Earth"** Write suitable SQL queries for the following: i. Returns the position of the first occurrence of the substring **"tree"** in the given string. ii. To extract last five characters from the string.	**2**
22	What will be the output of the following: import pandas as pd s1=pd.Series(data=2*(3,10)) print(s1)	2
23	Differentiate between the Accidental plagiarism and Deliberate plagiarism.	2
24	Complete the given Python code to get the required output as: **International Yoga Day** import _____ as sp cel={'Jan 12' : 'National Youth Day', 'Feb 28':'National Science Day', 'Apr 22':'World Earth Day', 'Jun 5':'World Environment Day', 'Jun 21':'International Yoga Day'} celebrations=__.Series(___) print(celebrations[_____])	**2**

25	What are aggregate functions in SQL? Name any two.	**2**
	SECTION-C	
26	Based on table STUDENT given here, write suitable SQL queries for the following:	**3**

Rollno	Name	Class	Gender	City	Marks
1	Abhishek	XI	M	Agra	430
2	Prateek	XII	M	Mumbai	440
3	Sneha	XI	F	Agra	470
4	Nancy	XII	F	Mumbai	492
5	Himnashu	XII	M	Delhi	360
6	Anchal	XI	F	Dubai	256
7	Mehar	X	F	Moscow	324
8	Nishant	X	M	Moscow	429

i. Display gender wise highest marks.

ii. Display city wise lowest marks.

iii. Display total number of male and female students.

OR

Predict the output of the following queries based on the table STUDENT given above:

i. SELECT Rollno, LEFT(Name,3) FROM STUDENT WHERE City= "Agra";

ii.SELECT count(Marks) "No of rows" FROM STUDENT WHERE class= "XI";

iii. SELECT Name,"scored ",Marks FROM STUDENT WHERE class= "XII";

27	Create a DataFrame in Python from the given list: [['Delhi',41,32],['Kolkata',38,26],['Chennai',35,28],['Bengaluru',34,29]] **Also give** appropriate column headings as shown below: City MaxTemp MinTemp 0 Delhi 41 32 1 Kolkata 38 26 2 Chennai 35 28 3 Bengaluru 34 29	**3**

28 Write MySQL statements for the following: **3**

i. To create a database named MOBILES.

ii. To create a table named COMPANY based on the following specification:

Column Name	Data Type	Constraints
cname	Varchar(20)	Primary Key
country_code	Int(3)	

29 Mr. Manoj who is a business man by profession faced following situations. Identify the type of crime for each situation/incident happened to him? **3**

(i) He was constantly receiving abusive emails

(ii) He clicked on an unknown link received as a result his personal sensitive information was acquired by someone

(iii) His laptop was controlled by somebody in an unauthorised way

OR

Mention any three hazards associated with inappropriate and excessive use of gadgets.

30 Consider the given DataFrame**'G**ames': **3**

	Name	Price
0	CHESS	150
1	CARROMS	900
2	LUDO	400

Write suitable Python statements for the following:

i. Add a new Game Scrabbles with price as 1200

ii. Add a column called Players with the following data:
[2 ,4, 4, 2].

iii. Rename the column 'Name' to 'Game_Name'.

SECTION-D

31 Consider the following table: 4
Table: emp

E_ID	EName	Dept	DOB	DOJ
Star1	Ishaan	Sales	1994-08-28	2020-02-14
Star2	Malvika	IT	1997-10-15	2021-11-19
Star3	Rajendra	Accounts	1998-10-02	2019-04-02
Star4	Monali	Sales	2000-02-17	2020-05-01
Star5	Sajal	IT	2001-12-05	2018-06-14
Star6	Jishu	Accounts	1995-01-03	2019-07-15
Star7	Julee	Sales	1985-11-14	2020-05-19

i. To display the name of eldest employee and his/her year of birth.

ii. To display the names of those employees whose joining month is May.

iii. Display the name of the weekday for the date of join of employee.

iv. Display eid and name of employees whose date of join is before 2020.

32 Consider the following dataframemdf. 4

	Rollno	Name	English	Hindi	Maths
0	1	Aditya	23	20	28
1	2	Balwant	18	1	25
2	3	Chirag	27	23	30
3	4	Deepak	11	3	7
4	5	Eva	17	21	24

Write python statements for

i. Predict the output of :

a. print(mdf.size)

b. print(mdf[2:4])

ii. Delete the last row from the DataFrame.

iii. Write Python statement to add a new column Total_Sales which is the total of marks of 3 subjects.

OR

(Option for part iii only)

Write Python statement to export the DataFrame to a CSV file named records.csv stored at F: drive.

SECTION-E

33 Write suitable SQL queries for the following: **5**

i. To calculate the **exponent for 5 raised to the power of 3.**

ii. To display current date and time.

iii. To round off the value -67.8745 to 2 decimal place.

iv. To remove all the probable leading and trailing spaces from the column empid of the table employee.

v. To display the length of the string **'** *G20* New Delhi *summit***'**

OR

Kathir has created following table named Workshop:

WorkshopId	Title	NumSpeakers	NumberInvites
551	Time Management	3	50
552	App Creation	1	40
553	Development & Planning	2	20
554	Marketing Strategies	2	25

Help him in writing SQL queries to the perform the following task:

i. Insert a new record in the table having following values:

[555, 'Budgeting' , 2 , 40]

ii. To change the value **"**App Creation**"** to **"App Development"** in Title column.

iii. To remove the records with NumberInvites less than 25 .

iv. To add a new column Dateofevent of suitable datatype.

v. To display records with NumSpeakers is 2

.

34 XYZ international school in one of the main cities is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A), and HOSTEL(H). **5**

Distance between various wings are given below :

Wing A to Wing S	100 m
Wing A to Wing J	200 m
Wing A to Wing H	400 m
Wing S to Wing J	300 m
Wing S to Wing H	100 m
Wing J to Wing H	450 m

Number of Computers

Wing A	10
Wing S	200
Wing J	100
Wing H	50

The owner is planning to form a network by joining these blocks.

i. Out of the four blocks on campus, suggest the location of the server that will provide the best connectivity. Explain your response.

ii. For very fast and efficient connections between various blocks within the campus, suggest a suitable topology and draw the same.

iii. Suggest the placement of the following devices with justification

(a) Repeater (b) Hub/Switch

iv. VoIP technology is to be used which allows one to make voice calls using a broadband internet connection. Expand the term VoIP.

v. If all wings are connected together, then out of LAN, MAN, or WAN, what kind of network it will become? Justify your answer.

35 Consider the readings made during an event: **5**

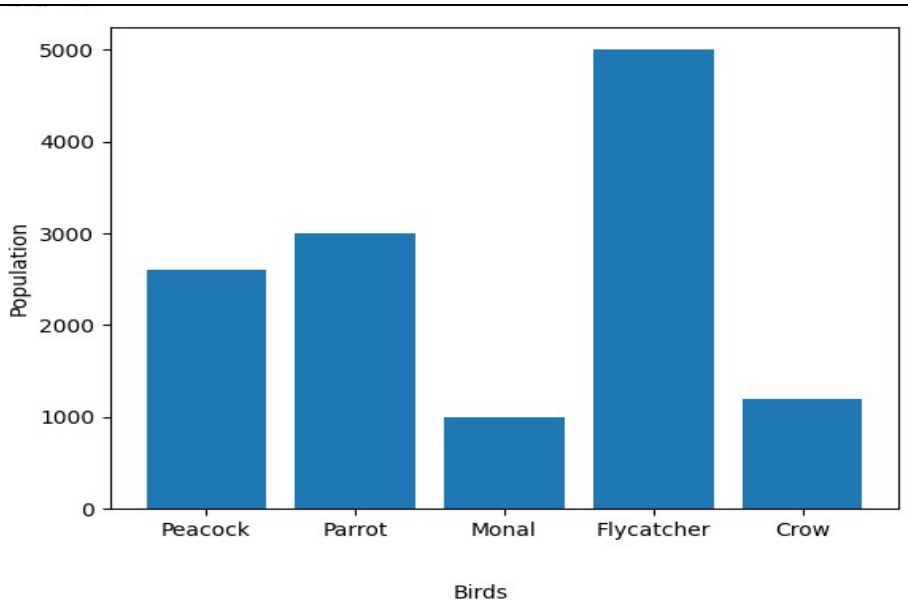
x = [**21,22,23,4,5,6,77,32,33,34,35,36,37,18,49,50,100**]

Write suitable Python code to generate a histogram based on the given data, along with an appropriate chart title and both axis labels.

Also write suitable python statement to save this chart.

OR

Write suitable Python code to create following Bar Chart:



Also write suitable python statement to save this chart.

MARKING SCHEME		
	SECTION-A	
1	ii. Modem	1
2	c) Lead	1
3	a. Copyright	1
4	15000	1
5	ii. COUNT()	1
6	iii. Google Chrome	1
7	a)All of the above	1
8	INSERT INTO Emp(Lastname) VALUES ('Sharma') ;	1
9	c)Represents the day (day of the month) of the specified date	1
10	c) s.tail()	1
11	a)Having	1
12	e) (3,4)	1
13	i. Mobile Phishing	1
14	b) mid()	1
15	Cookies	1
16	Creative Commons licenses	1
17	i. Both A and R are true and R is the correct explanation for A	1
18	i. Both A and R are true and R is the correct explanation for A	1
	SECTION-B	
19	A web browser is a program or software used for viewing a web page A web server is a program or a computer that provides services to other programs or computers called clients.	**2**
20	import pandas as pd devices={'Product': pd.Series(['Keyboard','Mouse','Printer','Speaker'],index=[11,22,33,44]), 'Prices': pd.Series([400,300,8000,450],index=[11,22,33,44])} rdf = pd.DataFrame(devices) print(rdf)	**2**
21	i. SELECT INSTR("Plant a tree , and save the Earth ",”tree”); ii. SELECT RIGHT("Plant a tree , and save the Earth ",5);	**2**

<table>
<tr><td>22</td><td>0 3
1 10
2 3
3 10
dtype: int64</td><td>2</td></tr>
<tr><td>23</td><td>Accidental/Unintentional Plagiarism: Involves careless paraphrasing (changing the words or sentence construction of a copied document), quoting text excessively with poor documentation.

Deliberate/Intentional Plagiarism: Includes copying someone else’s work, cutting and pasting blocks of text or any kind of media (audio, video files or movie clips) without documenting and at the same time publishing it on the web without the permission of developers/creators.</td><td>2</td></tr>
<tr><td>24</td><td>import pandas as sp
cel={'Jan 12' : 'National Youth Day','Feb 28':'National Science Day','Apr 22':'World Earth Day',
'Jun 5':'World Environment Day','Jun 21':'International Yoga Day'}
celebrations=sp.Series(cel)
print(celebrations)
print(celebrations['Jun 21'])</td><td>2</td></tr>
<tr><td>25</td><td>MySQL provides Aggregate or Group functions which work on a number of values of a column/expression and return a single value as the result. Some of the most frequently used. Aggregate functions inMySQL are : MIN(), MAX(), AVG(), SUM(), COUNT().</td><td>2</td></tr>
<tr><td></td><td>SECTION-C</td><td></td></tr>
<tr><td>26</td><td>i. select max(marks) from student group by gender;
ii. select min(marks) from student group by city;
iii. select gender,count(gender) from student group by gender;
OR
<table><tr><td>i. 1 Abhi
3 Sne</td><td>2. No of rows
3</td><td>iii. Prateek scored 440
Nancy scored 492
Himanshu Scored 360</td></tr></table></td><td>3</td></tr>
<tr><td>27</td><td>import pandas
x=[['Delhi',41,32],['Kolkata',38,26],['Chennai',35,28],['Bengaluru',34,29]]
df=pandas.DataFrame(x,columns=['City','MaxTemp','MinTemp'])
print(df)</td><td>3</td></tr>
<tr><td>28</td><td>Create database mobiles;
Create table company (cname varchar(20) primary key, country_code int(3));</td><td>3</td></tr>
<tr><td>29</td><td>(i) Cyber Bullying
(ii) Phishing</td><td>3</td></tr>
</table>

(iii) Hacking

OR

Be aware of the following consequences:
i) Eye strain ii) Painful muscles and joints iii) Poor memory iv) Lack of sleep v) Back pain and neck pain

30 iv. df.loc[3]=['Scrabbles',1200] **3**
v. df['Players']=[2,4,4,2]
vi. df.rename(columns={'Name':'Game_Name'}, inplace=True)

SECTION-D

31 v. Select EName,min(year(DOB)) from emp; 4
vi. Select EName from emp where month(DOJ)=5;
vii. Select dayname(DOJ) from emp;
viii. Select eid,ename from emp where doj<'2020-01-01';

32 i. a. 25 b. 4

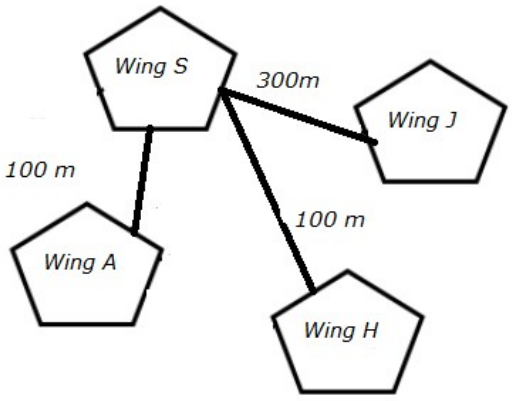
	Rollno	Name	English	Hindi	Maths
2	3	Chirag	27	23	30
3	4	Deepak	11	3	7

ii. mdf=mdf.drop(4)
OR
mdf.drop(4,axis=0)
iii. mdf["total"]=mdf["English"]+mdf["Hindi"]+mdf["Maths"]

OR
(Option for part iii only)
df.to_csv("F:\records.csv")

SECTION-E

33 i. SELECT POWER(5,3); **5**
ii. SELECT NOW();
iii.SELECT ROUND(-67.8745,2);
iv. SELECT TRIM(EMPID) FROM EMPLOYEE;
v. SELECT LENGTH("*G20* New Delhi *summit* ");

	OR **i.** **Insert into workshop values (**555, 'Budgeting' , 2 , 40); **ii.** **Update workshop set title="App Development" where title="App Creation"** iii. DELETE FROM **workshop** WHERE NumberInvites<25; iv. ALTER TABLE **workshop** ADD COLUMN **Dateofevent** date; **v.** Select * from exam where NumSpeakers =2;	
34	i. Wing S as it has the maximum number of computers ii. Star topology  iii. Repeater -As per above diagram , in between all the connections Hub/switch is to be kept in every building to interconnect all computers in each Wing iv. Voice Over Internet Protocol v. LAN -Given distances are less than 1 kilometer	**5**
35	import matplotlib.pyplot as plt x=[21,22,23,4,5,6,77,32,33,34,35,36,37,18,49,50,100] plt.hist(x,bins=5, histtype='bar', color='Green') plt.xlabel("X axis") plt.ylabel("Y axis") plt.show() plt.savefig("graph1.png") **OR** Also write suitable python statement to save this chart.	**5**

```
import matplotlib.pyplot as plt
Birds = ['Peacock','Parrot','Monal','Flycatcher','Crow']
Population =[2600,3000,1000,5000,1200]
plt.bar(Birds,Population)
plt.xlabel("Birds")
plt.ylabel("Population")
plt.show()
plt.savefig("graph2.png")
```

SAMPLE QUESTION PAPER
CLASS XII
INFORMATICS PRACTICES (065)

TIME: 03 HOURS M.M.: 70

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A has 18 questions carrying 01 marks each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 02 questions carrying 04 marks each.
7. Section E has 03 questions carrying 05 marks each.
8. All programming questions are to be answered using Python Language only.

	SECTION A	
1	Among the following, which device connects only similar types of networks together? a) Modem b) Gateway c) Bridge d) Router	1
2	Bridge uses _____ address a) IP address b)MAC Address c) Dynamic Address d) None These	1
3	_____ is called an intelligent HUB a) Router b) Modem c) Switch d) Repeater	1
4	CSV stands for: a) Column Separated Values b) Class Separated Values c) Comma Separated Values d) Comma Segregated Values	1
5	When a mobile phone cannot be repaired economically or is unserviceable , it is called a) E-waste b) M-waste c) PDA-waste d) Smart waste	1
6	_____ is used to identify a connection in a network a) MAC address b) URL c) IP address d)Physical address	1
7	The device which can convert analog signals to digital signals and vice versa is a) Router b) Bridge c) Gateway d) Modem	1
8	Which among the following supports vectorised operations a)List b)String c)Series d) Dictionary	1
9	Give the output of the following query select mod(day('2023-12-12'), 5); a)2.0 b)2 c)1012 d)1011	1
10	Which among the following sql functions is not a date and time function? a) now( ) b) sysdate( ) c) mod( ) d) year( )	1

11	What will be the output of : SELECT LEFT('2023-12-12', 4); a)Error b)12-12 c)3021 d)2023	1
12	Any information about you or created by you in digital form is a)Digital Property b) Intellectual Property c) E Content d) Website	1

13	Raj, a Database administrator wants to display the average mark of students from each 'department', in the increasing order of average mark. Table used to store the data is: student(Roll, Name, Deptno, Mark, DoB) Which of the following SQL statements can be used for this purpose? a)Select Deptno, AVG(Mark) from student group by Deptno order by avg(Mark); b)Select Deptno, AVERAGE(Mark) from student group by Deptno order by avg(Mark); c)Select Deptno, AVG(Mark) from student group by Roll order by avg(Mark); d)Select Deptno, AVERAGE(Mark) from student Group By average(Mark);	1
14	Which among the following SQL statements will produce the same result as that of: **SELECT UPPER(Name) FROM STUDENT ;** **a)SELECT UPPERCASE(Name)FROM STUDENT;** **b)SELECT UCASE(Name)FROM STUDENT;** **c)SELECT CAPITALISE(Name)FROM STUDENT;** **d)SELECT CAPITALS(Name)FROM STUDENT;**	1
15	By default how many rows of data will be displayed when the head( ) function is used without any parameter? a)First 5 rows b) Last 5 rows c) First 3 rows d) Last 3 rows	1
16	In order to denote the missing values with NaN, which module is required? a)pandas b)Series c) DataFrame d) numpy	1
17	**Assertion(A):** Apache HTTP Server is an Open Source Web Server Software. The source code of Apache is available to all. **Reasoning(R):** An open source software is the one which publishes the source code also with the freedom to download and study it. i) Both A and R are true and R is the correct explanation for A ii) Both A and R are true and R is not the correct explanation for A iii) A is True but R is False iv) A is false but R is True	1

18	**Assertion(A):** We can add or delete rows and columns with a Dataframe. Also we can modify the data. **Reasoning(R):**Dataframe is size mutable, value mutable i) Both A and R are true and R is the correct explanation for A ii) Both A and R are true and R is not the correct explanation for A iii) A is True but R is False iv) A is false but R is True	1
	SECTION B	
19	With the help of a proper example, explain different components of a URL OR Sinan wants to launch a website for his business. Suggest a webserver and any server side scripting language for creating and launching the website. Also explain him the concept of Dynamic web pages	2

20	Rewrite the following program after correcting the errors(if any). Underline the corrections made by you. **import Numpy** **import Pandas as pd** **L1 = ['Ramu' , 'Roja', 'Sayeed', 'Simran']** **M1 = [10, np.NaN, 11, 10]** **Df = pd.dataframe([L1, M1] , index= [1,2,3,4)** **print(Df)**	2
21	Consider the string "Hello World". a) Write a SQL statement to find the number of characters in it. b) Write a SQL statement to remove the spaces(if any) from either end	2
22	Predict the output of the following code **import numpy as np** **import pandas as pd** **L1 = ['Ramu' , 'Roja', 'Sayeed', 'Simran']** **M1 = [10, np.NaN, 11, 10]** **d = {'Name': L1, 'Mark': M1}** **roll=[1,2,3,4]** **Df = pd.DataFrame(d, index = roll)** **print(Df)**	2
23	Explain plagiarism. Suggest some preventive measures to avoid plagiarism.	2

24	Fill the missing lines to get the given output
	
	import _____ as pd
	
	da = {'Roll':[1,2,3,4,5], 'Eng':[10.0,12.0,11.0,10.3,9.8],
	'Maths':[10.5,12.1,9.8,10.8,10.3]}
	df=pd. _____ (_____) # creating the dataframe
	print(df[_____]) #print all details if value in 'Eng' column is greater than 10.0
	
	Output Required:
	`   Roll  Eng  Maths`
	`1  2  12.0  12.1`
	`2  3  11.0  9.8`
	`3  4  10.3  10.8`
		2

25	Distinguish between WHERE and HAVING clauses in SQL	2

	SECTION C	

26	**Consider the following Database table : Student**
	`+------+---------+------+------+------------+`
	`| roll | name | dno | mark | dob |`
	`+------+---------+------+------+------------+`
	`| 1 | Tom | 10 | 97 | 2002-12-10 |`
	`| 2 | Raju | 10 | 96 | 2003-10-10 |`
	`| 3 | Smitha | 10 | 98 | 2003-03-31 |`
	`| 4 | Athira | 11 | 95 | 2003-09-15 |`
	`| 5 | Manok | 11 | 96 | 2003-09-23 |`
	`| 6 | Anwar | 11 | 95 | 2003-12-23 |`
	`| 7 | Sameera | 12 | 98 | 2003-11-03 |`
	`| 8 | Maneesh | 12 | 99 | 2003-10-16 |`
	`+------+---------+------+------+------------+`
	(Itis given that roll - roll numbers, name - name of students, dno - department number, mark - mark scored by the student, dob - date of birth)
	
	Write suitable SQL queries for the following
	1. Display the details of all the students in the increasing order of their marks
	2. Display the department wise highest mark
	3. Display the details if the first letter of their name is 'A'
	
	OR
	Give the output of the following SQL statements based on the above database table, 'Student'
	1.**select name, dno from student where mark between 97 and 99;**
	2.**select roll, 100-mark as "Wrong Answers" from student order by roll desc;**
	3**. select roll, name, dno from student where mark is null;**
		3

27	**Write code to create the following dataframe, 'student'** **Roll Eng Maths IP** **Tom 1 10.0 10.5 12.0** **Sam 2 NaN 12.1 11.2** **Jam 3 11.0 9.8 12.3** **Lam 4 10.3 10.8 14.4** **Mam 5 9.8 10.3 13.2**	3
28	**Write SQL statement for the following** **a) Display the names of all the tables in the database, 'test'** **b) Create the table 'Student' with the following description**	3

Column	Data Type and Size	Constraints
Roll	Integer, 3	Primary key
Name	Varchar, 9	Not null
Dno	Integer, 3	Not null
mark	Decimal	
DoB	date	

29	Sooraj used a computer in an internet cafe to transfer some amount from his bank account to his friends account through internet banking. After the transaction he informed his friend regarding the transaction through email. Some time later he received messages from his bank and found that some more amount was transferred to some other unknown account which he did not do. Later he came to know that the password of his email account was also changed by somebody else. Based on the above information, answer the following a)Identify the type of cyber crime he is a victim of. b)What immediate steps should he take ? c)Name the Indian law to handle such crimes. **OR** Explain the benefits of E waste recycling	3

30	Consider the dataframe, 'Company', given below ABC HCL TCS INFOSYS 2019 100 170 134 142 2020 120 234 256 290 2021 145 200 278 280 2022 123 230 290 279 Write Python code for the following a) Add a column, 'Total' , by adding the values of each row. b) Add a row with index 2023 and value for each column as 140, 170,NaN, NaN c) Display the sum of all the values for the column, 'ABC'	3
	SECTION D	
31	**Consider the Database table, 'Customer', as given below created by Jathin to find some information regarding the customers of his super market.** +------+----------+----------+--------+------------+ | C_id | c_name | location | phone | dob | +------+----------+----------+--------+------------+ | 1 | vangchun | BLR | 145678 | 2000-01-20 | | 2 | Chunchun | BLR | 245678 | 2001-01-20 | | 3 | Kimchun | BLR | 335678 | 2001-12-20 | | 4 | Jimchun | CHN | 225678 | 2002-12-20 | | 5 | Rimchun | CHN | 775678 | 2002-11-20 | | 6 | Mimchun | KOL | 875678 | 2002-11-20 | +------+----------+----------+--------+------------+ Assist him to do the following by writing SQL queries. a)Display different locations of customers. b)Display the date of birth of the oldest customer c)Display the details of all those who were born in the year 2000 d)Display the location where more than 2 customers are there.	4
32	**Ramu is working as a Data Analyst and created a dataframe, 'Student' to analyse the result of some students. The dataframe is as given below:** **Roll Eng Maths IP** **Tom 1 10.0 10.5 12.0** **Sam 2 12.0 12.1 11.2** **Jam 3 11.0 9.8 12.3** **Lam 4 10.3 10.8 14.4** **Mam 5 9.8 10.3 13.2**	4

	Answer the following questions based on the above dataframe i)Predict the output of the following python statements a)**print(Student.index)** **b)Student.loc['Tom':'Jam', ['Eng','IP']]** ii)Delete the column, 'Roll' from the dataframe iii)Display the datatypes of each column OR (Only for question iii) Save the dataframe as a csv file. Named student.csv, in a folder named 'Data' of 'D' drive	
	SECTION E	
33	**Write SQL Queries for the following** **i) To find the remainder when 5 is divided by 2** **ii) T find position the string 'he' in the string 'hello'** **iii)To display the name of the month with the date, 12-12-2023.** **iv) To remove the decimal places without rounding the number, 214.65** **v) To display the date stored in your computer** **Sudha has created the following table, Student, to store the details of students.** +------+---------+------+------+------------+ | roll | name | dno | mark | dob | +------+---------+------+------+------------+ | 1 | Tom | 10 | 97 | 2002-12-10 | | 2 | Raju | 10 | 96 | 2003-10-10 | | 3 | Smitha | 10 | 98 | 2003-03-31 | | 4 | Athira | 11 | 95 | 2003-09-15 | | 5 | Manok | 11 | 96 | 2003-09-23 | | 6 | Anwar | 11 | 95 | 2003-12-23 | | 7 | Sameera | 12 | 98 | 2003-11-03 | | 8 | Maneesh | 12 | 99 | 2003-10-16 | +------+---------+------+------+------------+ **Help her to write SQL queries for the following** **i)To add one more row with the following values [9, Mahesh, 12, 98, 2003-02-21]** **ii)To change the mark of the student whose roll is 1. New mark is 99.** **iii)to increase the mark of all the students whose mark is 28 by 2.** **iv)Add a new column, 'Grade' with char as data type and size 2.** **v) To remove the details of the students whose roll is 1**	5

34	**ABC university has a campus in Mysore with 4 different blocks, named A, B, C, D . Distance between the blocks are as given in the table.**	5

Block A to Block B	**90 Metres**
Block A to Block C	**120 Metres**
Block A to Block D	**85 Metres**
Block B to Block C	**65 Metres**
Block B to Block D	**160 Metres**
Block D to Block C	**80 metres**

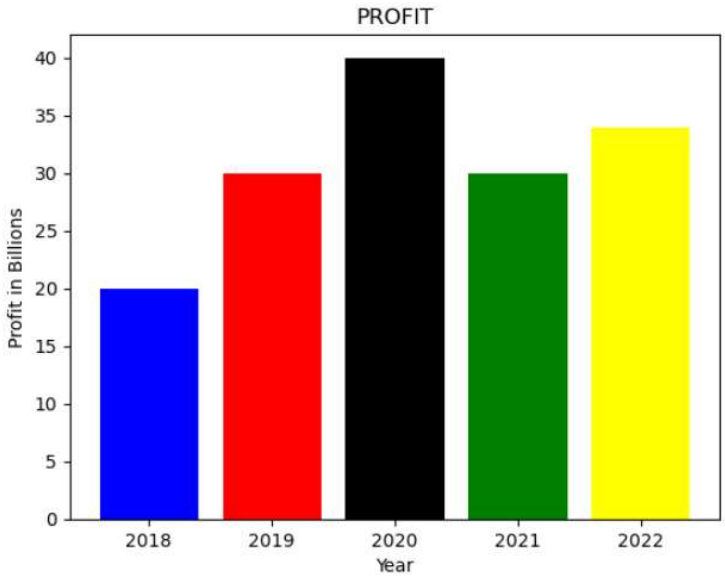
Number of computers in each block is as given in the table given below

Block A	150 Computers
Block B	120 Computers
Block C	90 Computers
Block d	75 Computers

University is planning to interconnect all the computers.

Answer the following based on the above data.

i) Suggest the block in which the server can be installed. Justify your answer.
ii) Where will you place HUB or Switch?
iii)Between which all blocks, if connected directly, repeaters are required?
iv)The University has a campus in Chennai. Suggest a suitable method to connect both the campuses together.
v)Suggest a mechanism to block the students of Mysore campus from using email while browsing.

35	The score of a team in a cricket match after every 5 overs in a 50 over match is as given below. [35, 56, 80, 102, 146, 178, 200, 234, 256, 278] Generate a line graph based on the above data. Line colour is to be red. The label along the X axis is 'Overs' and along the Y axis is 'RUNS'. Title must be 'Cricket'. **OR** **Write Python code to generate the following Bar Graph to represent the profit made by a company in the last 5 years.**  **Each of the bars must be in different colours.**	5

ANSWER KEY FOR SAMPLE QUESTION PAPER
CLASS XII
INFORMATICS PRACTICES (065)

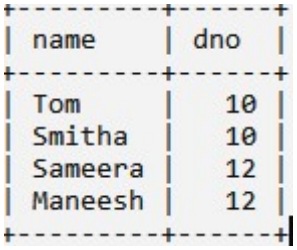
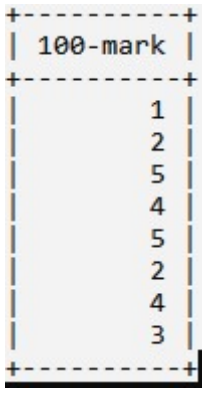
TIME: 03 HOURS M.M.: 70

1	c)Bridge. Bridge connects similar types of networks and uses MAC addresses.	1
2	b) MAC Address	1
3	c)Switch	1
4	c) Comma Separated Values	1
5	a) E-waste	1
6	c)IP Address	1
7	d)Modem	1
8	c)Series	1
9	b)2	1
10	c)mod( )	1
11	d)2023	1
12	a)Digital Property	1
13	a) Select Deptno, AVG(Mark) from student group by Deptno order by avg(Mark)	1
14	b)**SELECT UCASE(Name)FROM STUDENT;**	1
15	a)First 5 rows	1
16	d)numpy	1
17	a) Both A and R are true and R is the correct explanation for A	1
18	a) Both A and R are true and R is the correct explanation for A	1
19	URL: It stands for Uniform Resource Locator. It provides the location and mechanism (protocol) to access the resources over the internet. URL is sometimes also called a web address. It not only contains the domain name, but other information as well that completes a web address. Examples: https://www.cbse.nic.in, https://www.mhrd.gov.in, http://www.ncert.nic.in, http://www.airindia.in, etc.	1 1

	OR Web Server: Apache Server Side Scripting Language: PHP, ASP, JSP Dynamic Web Page: Provides content which will be specific to a particular user/visitor	1 1

20	import numpy as np import pandas as pd L1 = ['Ramu' , 'Roja', 'Sayeed', 'Simran'] M1 = [10, np.NaN, 11, 10] Df = pd.DataFrame([L1, M1], index=[1,2]) print(Df)	
21	a)SELECT LENGTH("Hello world"); b)SELECT TRIM("HELLO WORLD:);	1 1
22	Name Mark 1 Ramu 10.0 2 Roja NaN 3 Sayeed 11.0 4 Simran 10.0	2
23	Plagiarism: copying others creativity and presenting it as your own original work. To avoid this: do not copy others' work deliberately. Use online tools available to check if plagiarism happened accidentally.	1 1
24	import pandas as pd da = {'Roll':[1,2,3,4,5],\ 'Eng':[10.0,12.0,11.0,10.3,9.8],\ 'Maths':[10.5,12.1,9.8,10.8,10.3]} df=pd.DataFrame(da) print(df[df['Eng']>10])	2
25	WHERE - applies the condition on individual row HAVING is used when condition with aggregate function is applied on a group of rows	1 1

26	1.select * from student order by mark; 2.select dno, max(mark) from student group by mark; 3.select * from student where name LIKE('A%'); OR	1 1 1

1	2	3
 +---------+------+ | name | dno | +---------+------+ | Tom | 10 | | Smitha | 10 | | Sameera | 12 | | Maneesh | 12 | +---------+------+	 +----------+ | 100-mark | +----------+ | 1 | | 2 | | 5 | | 4 | | 5 | | 2 | | 4 | | 3 | +----------+	Empty set (0.01 sec)

27	import numpy as np import pandas as pd da = {'Roll':[1,2,3,4,5],\ 'Eng':[10.0,np.NaN,11.0,10.3,9.8],\ 'Maths':[10.5,12.1,9.8,10.8,10.3],\ 'IP':[12.0,11.2,12.3,14.4,13.2]} df=pd.DataFrame(da, index=['Tom', 'Sam', 'Jam', 'Lam', 'Mam']) print(df)	3
28	a)use test; Show tables; b) CREATE TABLE Student(Roll int(3) Primary Key, Name varchar(9) NOT NULL, Dno int(3) Not Null, Mark decimal(5,2) DoB date);	1 2
29	a)Hacking b)Inform the cyber cell of the police department. Contact the bank to Block all the transactions.	
	c)IT Act 2000 OR E waste recycling increases employment, saves space, saves the environment, can save resources, prevents toxic substances from entering the human body and from polluting water resources etc	

30	a) Company['Total']=Company.sum(axis=1) b) Company.loc[“2023”] = [140,170,NaN,NaN] c) Company[‘ABC’].sum( )	1 1 1
31	a)select distinct location from customer; b)select min(dob) from customer; c)select * from customer where year(dob)=2000; d)select location from customer group by location having count(*) > 2;	1 1 1 1
32	1 a) Index(['Tom', 'Sam', 'Jam', 'Lam', 'Mam'], dtype='object') 1 b) Eng IP Tom 10.0 12.0 Sam 12.0 11.2 Jam 11.0 12.3 2 Student.drop(['Roll'], axis=1, inplace=True) 3)Student.dtypes OR Student.to_csv(r“D:\Data\Student.csv”)	1 1 1 1

33	i)select mod(5,2);
	ii)select instr(‘hello’, ‘he’);
	iii)select monthname(‘2023-12-12’);
	iv)select truncate(214.65, 0);
	v)select sysdate( );
	OR
	i)INSERT INTO student Values(9, ‘Mahesh’, 12,98, ‘2003-02-21’);
	ii)Update student set mark =99 where roll=1;
	iii)Update student set mark = mark+2 where mark =28;
	iv)Alter table student add column grade char(2);
	v)Delete from student where roll = 1;
		5

34	i)Block A. According to the 80-20 Rule. ii)HUB or SWITCH is required in every block iii)Between Block A to Block C and between Block B to Block D	1 1 1
	iv)Establish VPN or use satellite mode of communication v)Use a Firewall and configure it to block email communication.	1 1

35	import matplotlib.pyplot as plt overs=[5,10,15,20,25,30,35,40,45,50] runs=[35, 56, 80, 102, 146, 178, 200, 234, 256, 278] plt.plot(overs, runs, color='red') plt.xlabel('OVERS') plt.ylabel('RUNS') plt.title('CRICKET') plt.show() OR import matplotlib.pyplot as plt profit=[20,30,40,30,35] yr=[2018,2019,2020,2021,2022] plt.bar(yr,profit, color=['red', 'blue', 'green', 'cyan', 'pink']) plt.xlabel('YEAR') plt.ylabel('Profit in Billions') plt.title('PROFIT') plt.show()	5

CBSE SAMPLE QUESTION PAPER CLASS XII

INFORMATICS PRACTICES (065)

TIME: 03 HOURS **M.M.: 70**

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A has 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 02 questions carrying 04 marks each.
7. Section E has 03 questions carrying 05 marks each.
8. All programming questions are to be answered using Python Language only

	SECTION A	
1.	A_____is a device that connects the organisation's network with theoutside world of the Internet. i. Hub ii. Modem iii. Gateway iv. Repeater	1
2.	When e-waste such as electronic circuit boards are burnt for disposal, the elements contained in them create a harmful chemical called_____which causes skin diseases, allergies and an increased risk of lung cancer. i. Hydrogen ii. Beryllium iii. Chlorine iv. Oxygen	1
3.	Copyright, Patent and Trademark comes under: i. Intellectual Property Right ii. Individual Property Right iii. Industrial Property Right iv. International Property Right	1
4.	Predict the output of the following query: `SELECT MOD (9,0);` i. 0 ii. NULL iii. NaN iv. 9	1

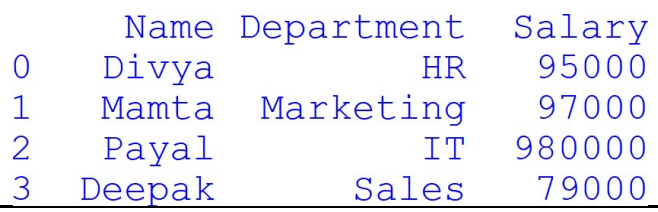
5.	Which of the following SQL functions does not belong to the Math functions category? i. POWER() ii. ROUND() iii. LENGTH() iv. MOD()	1
6.	_____ is not a FOSS tool. i. Libre Office ii. Mozilla Firefox iii. Google Chrome iv. Python	1
7.	CSV stands for: i. Column Separated Value ii. Class Separated Value iii. Comma Separated Value iv. Comma Segregated Value	1

8.	Raj, a Database Administrator, needs to display the average pay of workers from those departments which have more than five employees. He is experiencing a problem while running the following query:
	
	SELECT DEPT, AVG(SAL) FROM EMP WHERE COUNT(*) > 5
	GROUP BY DEPT;
	
	Which of the following is a correct query to perform the given task?
	
	i. SELECT DEPT, AVG(SAL) FROM EMP WHERE COUNT(*) > 5 GROUP BY DEPT;
	ii. SELECT DEPT, AVG(SAL) FROM EMP HAVING COUNT(*) > 5 GROUP BY DEPT;
	iii. SELECT DEPT, AVG(SAL) FROM EMP GROUP BY DEPT WHERE COUNT(*) > 5;
	iv. SELECT DEPT, AVG(SAL) FROM EMP GROUP BY DEPT HAVING COUNT(*) > 5;
		1

9.	Predict the output of the following query: SELECT LCASE (MONTHNAME ('2023-03-05')); i. May ii. March iii. may iv. march	1
10.	Which of the following command will show the last 3 rows from a Pandas Series named NP? i. NP.Tail( ) ii. NP.tail(3) iii. NP.TAIL(3) iv. All of the above	1
11.	With reference to SQL, identify the invalid data type. i. Date ii. Integer iii. Varchar iv. Month	1
12.	In Python Pandas, while performing mathematical operations on series, index matching is implemented and all missing values are filled in with _by default. i. Null ii. Blank iii. NaN iv. Zero	1
13.	By restricting the server and encrypting the data, a software company's server is unethically accessed in order to obtain sensitive information. The attacker blackmails the company to pay money for getting access to the data, and threatens to publish sensitive information unless price is paid. This kind of attack is known as: i. Phishing ii. Identity Theft iii. Plagiarism iv. Ransomware	1

14.	In SQL, the equivalent of UCASE() is: i. UPPERCASE () ii. CAPITALCASE() iii. UPPER() iv. TITLE ()	1
15.	Collection of hyper linked documents available on the internet is known as . i. Website ii. Webpage iii. Web Server iv. Web Hosting	1
16.	is a non-profit organization that aims to build a publicly accessible global platform where a range of creative and academic work is shared freely. i. Creative Cost ii. Critical Commons iii. Creative Commons iv. Creative Common	1
17.	Assertion (A):- MODEM stands for modulator-demodulator. Reasoning (R): - It is a computer hardware device that converts data from a digital format to analog and vice versa. i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True	1
18.	Assertion (A):- To use the Pandas library in a Python program, one must import it. Reasoning (R): - The only alias name that can be used with the Pandas library is pd. i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True	1
	SECTION B	

19.	Briefly explain the basic concepts of a web server and web hosting. OR Rati is doing a course in networking. She is unable to understand the concept of URL. Help her by explaining it with the help of suitable example.	2
20.	The python code written below has syntactical errors. Rewrite the correct code and underline the corrections made. Import pandas as pd df ={"Technology":["Programming","Robotics","3D Printing"],"Time(in months)":[4,4,3]} df= Pd.dataframe(df) Print(df)	2
21.	Consider the given SQL string: "12#All the Best!" Write suitable SQL queries for the following: i. Returns the position of the first occurrence of the substring "the" in the given string. ii. To extract last five characters from the string.	2
22.	Predict the output of the given Python code: import pandas as pd list1=[-10,-20,-30] ser = pd.Series(list1*2) print(ser)	2
23.	Differentiate between the active digital footprint and passive digital footprints.	2
24.	Complete the given Python code to get the required output as: Rajasthan import as pd di = {'Corbett': 'Uttarakhand', 'Sariska': 'Rajasthan', 'Kanha': 'Madhya Pradesh', 'Gir':'Gujarat'} NP = . Series( ) print(NP[ ])	2
25.	What are aggregate functions in SQL? Name any two.	2
	SECTION C	

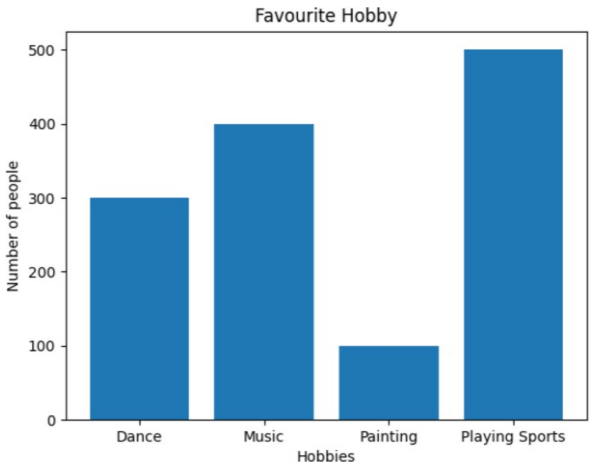
26.	Based on the SQL table CAR_SALES, write suitable queries for the following: + + + + + + | NUMBER | SEGMENT | FUEL | QT1 | QT2 | + + + + + + | 1 | Compact HatchBack | Petrol | 56000 | 70000 | | 2 | Compact HatchBack | Diesel | 34000 | 40000 | | 3 | MUV | Petrol | 33000 | 35000 | | 4 | MUV | Diesel | 14000 | 15000 | | 5 | SUV | Petrol | 27000 | 54000 | | 6 | SUV | Diesel | 18000 | 30000 | | 7 | Sedan | Petrol | 8000 | 10000 | | 8 | Sedan | Diesel | 1000 | 5000 | + + + + + + i. Display fuel wise average sales in the first quarter. ii. Display segment wise highest sales in the second quarter. iii. Display the records in the descending order of sales in the second quarter. OR Predict the output of the following queries based on the table CAR_SALES given above: i. SELECT LEFT(SEGMENT,2) FROM CAR_SALES WHERE FUEL= "PETROL"; ii. SELECT (QT2-QT1)/2 "AVG SALE" FROM CAR_SALES WHERE SEGMENT= "SUV"; iii. SELECT SUM(QT1) "TOT SALE" FROM CAR_SALES WHERE FUEL= "DIESEL";	3
27.	Create a DataFrame in Python from the given list: [['Divya','HR',95000],['Mamta','Marketing',97000],['Payal','IT',980000], ['Deepak','Sales',79000]] Also give appropriate column headings as shown below:  Name Department Salary 0 Divya HR 95000 1 Mamta Marketing 97000 2 Payal IT 980000 3 Deepak Sales 79000	3
28.	Write MySQL statements for the following: i. To create a database named FOOD. ii. To create a table named Nutrients based on the following specification:	3

Column Name	Data Type	Constraints
Food_Item	Varchar(20)	Primary Key
Calorie	Integer	

29.	Richa, recently started using her social media account. Within a few days, she befriends many people she knows and some that she does not know. After some time, she starts getting negative comments on her posts. She also finds that her pictures are being shared online without her permission. Based on the given information, answer the questions given below. i. Identify the type of cybercrime she is a victim of. ii. Under which act, she can lodge a complaint to the relevant authorities? ii. Suggest her any two precautionary measures which she should take in future while being online to avoid any such situations. OR Mention any three health hazards associated with inappropriate and excessive use of gadgets.	3
30.	Consider the given DataFrame 'Genre': Type Code 0 Fiction F 1 Non Fiction NF 2 Drama D 3 Poetry P Write suitable Python statements for the following: i. Add a column called Num_Copies with the following data: [300,290,450,760]. ii. Add a new genre of type 'Folk Tale' having code as "FT" and 600 number of copies. iii. Rename the column 'Code' to 'Book_Code'.	3
	SECTION D	
31.	Preeti manages database in a blockchain start-up. For business purposes, she created a table named BLOCKCHAIN. Assist her by writing the following queries: TABLE: BLOCKCHAIN	4

	+----+----------+-------+--------+------------------+ | id | user | value | hash | transaction_date | +----+----------+-------+--------+------------------+ | 1 | Steve | 900 | ERTYU | 2020-09-19 | | 2 | Meesha | 145 | @345r | 2021-03-23 | | 3 | Nimisha | 567 | #wert5 | 2020-05-06 | | 4 | Pihu | 678 | %rtyu | 2022-07-13 | | 5 | Kopal | 768 | rrt4% | 2021-05-15 | | 7 | Palakshi | 534 | wer@3 | 2022-11-29 | +----+----------+-------+--------+------------------+ i. Write a query to display the year of oldest transaction. ii. Write a query to display the month of most recent transaction. iii. Write a query to display all the transactions done in the month of May. iv. Write a query to count total number of transactions in the year 2022.	
32.	Ekam, a Data Analyst with a multinational brand has designed the DataFrame df that contains the four quarter's sales data of different stores as shown below: Store Qtr1 Qtr2 Qtr3 Qtr4 0 Store1 300 240 450 230 1 Store2 350 340 403 210 2 Store3 250 180 145 160 Answer the following questions: i. Predict the output of the following python statement: a. print(df.size) b. print(df[1:3]) ii. Delete the last row from the DataFrame. iii. Write Python statement to add a new column Total_Sales which is the addition of all the 4 quarter sales. OR (Option for part iii only) Write Python statement to export the DataFrame to a CSV file named data.csv stored at D: drive.	4
	SECTION E	
33.	Write suitable SQL queries for the following: i. To calculate the exponent for 3 raised to the power of 4. ii. To display current date and time. iii. To round off the value -34.4567 to 2 decimal place. iv. To remove all the probable leading and trailing spaces from the column userid of the table named user. v. To display the length of the string 'FIFA World Cup'.	5
	OR Kabir has created following table named exam: + + + + +	

		RegNo | Name | Subject | Marks | + + + + + | 1 | Sanya | Computer Science | 98 | | 2 | Sanchay | IP | 100 | | 3 | Vinesh | CS | 90 | | 4 | Sneha | IP | 99 | | 5 | Akshita | IP | 100 | + + + + + Help him in writing SQL queries to the perform the following task: i. Insert a new record in the table having following values: [6,'Khushi','CS',85] ii. To change the value "IP" to "Informatics Practices" in subject column. iii. To remove the records of those students whose marks are less than 30 . iv. To add a new column Grade of suitable datatype. v. To display records of "Informatics Practices" subject.	
34.	XYZ Media house campus is in Delhi and has 4 blocks named Z1, Z2, Z3 and Z4. The tables given below show the distance between different blocks and the number of computers in each block. **Block Z1 to Block Z2 — 80 metres** **Block Z1 to Block Z3 — 65 metres** **Block Z1 to Block Z4 — 90 metres** **Block Z2 to Block Z3 — 45 metres** **Block Z2 to Block Z4 — 120 metres** **Block Z3 to Block Z4 — 60 metres** **Block** / **Number of computers** Z1 — 135 Z2 — 290 Z3 — 180 Z4 — 195	5

	The company is planning to form a network by joining these blocks. i. Out of the four blocks on campus, suggest the location of the server that will provide the best connectivity. Explain your response. ii. For very fast and efficient connections between various blocks within the campus, suggest a suitable topology and draw the same. iii. Suggest the placement of the following devices with justification (a) Repeater (b) Hub/Switch iv. VoIP technology is to be used which allows one to make voice calls using a broadband internet connection. Expand the term VoIP. v. The XYZ Media House intends to link its Mumbai and Delhi centers. Out of LAN, MAN, or WAN, what kind of network will be created? Justify your answer.	
35.	The heights of 10 students of eighth grade are given below: Height_cms=[145,141,142,142,143,144,141,140,143,144] Write suitable Python code to generate a histogram based on the given data, along with an appropriate chart title and both axis labels. Also give suitable python statement to save this chart. OR Write suitable Python code to create 'Favourite Hobby' Bar Chart as shown below:  Also give suitable python statement to save this chart.	5

MARKING SCHEME SAMPLE QUESTION PAPER CLASS XII
INFORMATICS PRACTICES (065)

TIME: 03 HOURS M.M.: 70

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A has 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 02 questions carrying 04 marks each.
7. Section E has 03 questions carrying 05 marks each.
8. All programming questions are to be answered using Python Language only.

	SECTION A	
1.	iii. Gateway **(1 mark for correct answer)**	1
2.	ii. Beryllium **(1 mark for correct answer)**	1
3.	i. Intellectual Property Right **(1 mark for correct answer)**	1
4.	iv. NULL **(1 mark for correct answer)**	1
5.	iii. LENGTH () **(1 mark for correct answer)**	1
6.	iii. Google Chrome **(1 mark for correct answer)**	1
7.	iii. Comma Separated Value **(1 mark for correct answer)**	1
8.	`iv. SELECT DEPT, AVG(SAL) FROM EMP GROUP BY DEPT HAVING COUNT(*) > 5;` **(1 mark for correct answer)**	1
9.	iv. march **(1 mark for correct answer)**	1
10.	ii. NP.tail(3) **(1 mark for correct answer)**	1
11.	iv. Month (1 mark for correct answer)	1

12.	iii. NaN (1 mark for correct answer)	1
13.	iv. Ransomware (1 mark for correct answer)	1
14.	iii. UPPER( ) (1 mark for correct answer)	1
15.	i. Website (1 mark for correct answer)	1
16.	iii. Creative Commons (1 mark for correct answer)	1
17.	i. Both A and R are true and R is the correct explanation for A (1 mark for correct answer)	1
18.	iii. A is True but R is False (1 mark for correct answer)	1
	SECTION B	
19.	Web server: A web server is used to store and deliver the contents of a website to clients such as a browser that request it. A web server can be software or hardware. Web hosting: It is a service that allows to put a website or a web page onto the Internet, and make it a part of the World Wide Web. (1 mark each for each correct explanation) OR URL: It stands for Uniform Resource Locator. It provides the location and mechanism (protocol) to access the resources over the internet. URL is sometimes also called a web address. It not only contains the domain name, but other information as well that completes a web address. Examples: https://www.cbse.nic.in, https://www.mhrd.gov.in, http://www.ncert.nic.in, http://www.airindia.in, etc. (1 mark for correct explanation) (1 mark for correct example)	2
20.	import pandas as pd df ={"Technology":["Programming","Robotics","3D Printing"],"Time(in months)":[4,4,3]} df= pd.DataFrame(df)	2

	print(df) (1/2 mark for each correction)	

21.	i. SELECT INSTR("12#All the Best!","the");
	ii. SELECT RIGHT("12#All the Best!",5);
	(1 mark for each correct query)
		2

22.	0 -10 1 -20 2 -30 3 -10 4 -20 5 -30 (2 marks for correct output)	2
23.	Active Digital Footprints: Active digital footprints include data that we intentionally submit online. This would include emails we write, or responses or posts we make on different websites or mobile Apps, etc. Passive Digital Footprints: The digital data trail we leave online unintentionally is called passive digital footprints. This includes the data generated when we visit a website, use a mobile App, browse Internet, etc. (2 marks for correct differentiation)	2
24.	import pandas as pd di = {'Corbett': 'Uttarakhand', 'Sariska':'Rajasthan', 'Kanha': 'Madhya Pradesh','Gir':'Gujarat'} NP = pd.Series(di) print(NP['Sariska']) (1/2 mark for each correct fill-up)	2
25.	Aggregate functions: These are also called multiple row functions. These functions work on a set of records as a whole, and return a single value for each column of the records on which the function is applied. Max(), Min(), Avg(), Sum(), Count() and Count(*) are few examples of multiple row functions. (1 mark for correct explanation) (½ mark each for two correct names)	2
	SECTION C	

26.	i. SELECT FUEL, AVG(QT1) FROM CAR_SALES GROUP BY FUEL;
	ii. SELECT SEGMENT, MAX(QT2) FROM CAR_SALES GROUP BY SEGMENT;
	iii. SELECT * FROM CAR_SALES ORDER BY QT2 DESC;
	(1 mark for each correct query)
		3

	OR i. + + | LEFT(SEGMENT,2) | + + | Co | | MU | | SU | | Se | + + ii. + + | AVG SALE | + + | 13500.0000 | | 6000.0000 | + + iii. + + | TOT SALE | + + | 67000 | + + (1 mark each correct output)	

27.	import pandas as pd #Statement 1
	df=[["Divya","HR",95000],["Mamta","Marketing",97000
	],["Payal","IT",980000], ["Deepak","Sales",79000]] #Statement 2
	df=pd.DataFrame(df,columns=["Name","Department", "Salary"])
	#Statement 3
	print(df) #Statement 4
	(#Statement 1 & 4 – ½ mark each) (#Statement 2 & 3 – 1 mark each)
		3

28.	i. CREATE DATABASE FOOD; (1 mark for correct answer) ii. CREATE TABLE NUTRIENTS(NAME VARCHAR(20) PRIMARY KEY,CALORIES INTEGER); (½ mark for CREATE TABLE NUTRIENTS ½ mark each for correctly specifying each column ½ mark for correctly specifying primary key)	3
29.	i. She is a victim of Cyber Bullying. ii. Information Technology Act, 2000 (also known as IT Act).	3

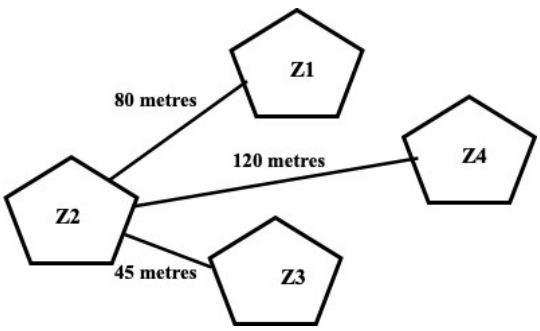
	iii. a. Need to be careful while befriending unknown people on the internet. b. Never share personal credentials like username and password with others. (1 mark for each correct answer) OR Simran needs to be made aware of the following consequences: i) Eye strain ii) Painful muscles and joints iii) Poor memory iv) Lack of sleep v) Back pain and neck pain (1 mark each for writing any 3 correct health hazards)	
30.	i. Genre["Num_Copies"]=[300,290,450,760] ii. Genre.loc[4]=["Folk Tale","FT",600] iii.Genre=Genre.rename({"Code":"Book_Code"}, axis=1) OR Genre=Genre.rename({"Code":"Book_Code"}, axis="columns") (1 mark for each correct statement)	3
	SECTION D	

31.	i. SELECT YEAR(MIN(TRANSACTION_DATE)) FROM BLOCKCHAIN;
	ii. SELECT MONTH(MAX(TRANSACTION_DATE)) FROM BLOCKCHAIN;
	iii. SELECT * FROM BLOCKCHAIN WHERE MONTHNAME (TRANSACTION_DATE)='MAY';
	iv. SELECT COUNT(ID) FROM BLOCKCHAIN WHERE YEAR(TRANSACTION_DATE)=2022;
	(1 mark for each correct query)
		4

32.	i. a. 15 b. Store Qtr1 Qtr2 Qtr3 Qtr4 1 Store2 350 340 403 210 2 Store3 250 180 145 160 (½ mark for each correct output/statement) ii. df=df.drop(2) OR df.drop(2,axis=0) (1 mark for correct statement) iii. df["total"]=df["Qtr1"]+df["Qtr2"]+df["Qtr3"]+df["Qtr 4"] OR	4

	df.to_csv("D:\data.csv") (2 mark for correct statement)	
	SECTION E	

33.	i. SELECT POWER(3,4);
	ii. SELECT NOW();
	iii. SELECT ROUND(-34.4567,2);
	iv. SELECT TRIM(USERID) FROM USER;
	v. SELECT LENGTH("FIFA World Cup");
	(1 mark for each correct query)
	OR
	Ans:
	i. INSERT INTO EXAM VALUES(6,'Khushi','CS',85);
	ii. UPDATE EXAM SET subject= "Informatics Practices" where subject = "IP";
	iii. DELETE FROM EXAM WHERE marks<30;
	iv. ALTER TABLE EXAM ADD COLUMN grade varchar(2);
	v. Select * from exam where subject="Informatics Practices";
	(1 mark for each correct query)
		5

34.	i. Z2 as it has maximum number of computers. ii. For very fast and efficient connections between various blocks within the campus suitable topology: Star Topology	5
	 iii. Repeater: To be placed between Block Z2 to Z4 as distance between them is more than 100 metres. Hub/Switch: To be placed in each block as each block has many computers that needs to be included to form a network. iv. Voice Over Internet Protocol v. WAN as distance between Delhi and Mumbai is more than 40kms. (1 mark for each correct answer)	

35.	import matplotlib.pyplot as plt #Statement
	Height_cms=[145,141,142,142,143,143,141,140,143,144]#Statement 2
	plt.hist(Height_cms) #Statement 3
	plt.title("Height Chart") #Statement 4
	plt.xlabel("Height in cms") #Statement 5
	plt.ylabel("Number of people") #Statement 6
	plt.show() #Statement 7
	(½ mark each for each correct statement 1,2,4,5,6,7)
	(1 mark for correct statement 3)
	
	plt.savefig("heights.jpg")
	
	(1 mark for the correct statement)
	OR
	import matplotlib.pyplot as plt #Statement 1
	hobby = ('Dance', 'Music', 'Painting', 'Playing Sports') #Statement 2
	users = [300,400,100,500] #Statement 3
	plt.bar(hobby, users) #Statement 4
	plt.title("Favourite Hobby") #Statement 5
	plt.ylabel("Number of people") #Statement 6
	plt.xlabel("Hobbies") #Statement 7
	plt.show() #Statement 8
	(½ mark for each correct statement) plt.savefig("hobbies.jpg")
	(1 mark for the correct statement)
		5

SAMPLE QUESTION PAPER
CLASS XII (2023-24)
INFORMATICS PRACTICES (065)

TIME: 03 HOURS **M.M.: 70**

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A has 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 02 questions carrying 04 marks each.
7. Section E has 03 questions carrying 05 marks each.
8. All programming questions are to be answered using Python Language only.

	SECTION A	
1	A _____is used to broadcast incoming messages to all devices connected to it. i. Hub ii. Modem iii. Gateway iv. Repeater	1
2	Which of the following is not recommended method for handling e-waste. i. Reduce the use of electronic devices ii. Donate the device to someone in need iii. Burn the device iv. Refurbish the device and use it	1
3	An electronic device manufacturer uses a distinguishing mark to identify his products. This is an example of: i. Trademark ii. Copyright iii. patent iv. None of the above	1
4	Predict the output of the following query: `SELECT ROUND (12.72399,2);` 1. 12 2. 12.72 3. 12.73 4. 12.724	1
5	Which of the following SQL functions is not an aggregate function? i. MIN() ii. SUM() iii. MOD() iv. AVG()	1
6	Which of the following is an open source web browser. i. Windwos	1

	ii. Microsoft Office iii. Mozilla Firefox iv. Edge	
7	Which command is used to take contents from a comma separated values file and load it into a DataFrame? i. load_csv ii. insert_csv iii. read_csv iv. csvread	1

8	Ranjana, a Database Administrator, needs to display the number of employees from of the departments in which the average salary is more than 20000. She is experiencing a problem while running the following query:
	SELECT DEPT, AVG(SAL) FROM EMP WHERE COUNT(*) > 20000
	GROUP BY DEPT;
	Which of the following is a correct query to perform the given task?
	i. SELECT DEPT, AVG(20000) FROM EMP GROUP BY DEPT HAVING COUNT(*)>20000;
	ii. SELECT DEPT, COUNT(*) FROM EMP GROUP BY DEPT WHEREAVG(SAL)>20000;
	iii. SELECT DEPT, COUNT(*) FROM EMP GROUP BY DEPT HAVING AVG(SAL)>20000;
	iv. SELECT DEPT, AVG(*) FROM EMP GROUP BY DEPT HAVING COUNT(SAL)>20000;
		1

9	Predict the output of the following query: **SELECT RIGHT (MONTHNAME ('2023-03-05'),3);** i. mar ii. arch iii. rch iv. arc	1
10	Which of the following command will show the last 10 rows from a Pandas Series named NP? i. NP.Tail(10) ii. NP.tail() iii. NP.TAIL(10) iv. NP.tail(10)	1
11	Which of the following is not a DML command in SQL. i. insert ii. update iii. append iv. delete	1
12	In Python Pandas, which statement is true regarding DataFrames. i. A column must have homogenous data type ii. A row must have homogenous data type iii. A column can have heterogeneous data types.	1

	iv. Rows and Columns must have homogeneous data types	
13	Stealing a pen drive from a computer store is which type of crime: i. Phishing ii. Identity Theft iii. Plagiarism iv. None of above	1
14	In SQL, the equivalent of MID() function is: i. Middle() ii. Median() iii. SUBSTR() iv. Min()	1
15	A website is hosted on a _____ i. Search Engine ii. Webpage iii. Web Server iv. FTP Server	1
16	_____is known as the father of open source movement. i. Steve Jobs ii. Bill Gates iii. Larry Paige iv. Richard Stallman	1
17	**Assertion (A):-**A histogram is used to know the distribution of data points for a one dimensional data **Reasoning (R): -**A histogram divides the data points into different ranges and identifies the number of data points lying within that range. i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True	1
18	**Assertion (A):-**Addition between two series objects containing numerical data is always possible **Reasoning (R): -**Whenever two series objects are added, the addition is done on matching index and any missing values are filled with NaN. i. Both A and R are true and R is the correct explanation for A ii. Both A and R are true and R is not the correct explanation for A iii. A is True but R is False iv. A is false but R is True	1
	SECTION B	
19	Differentiate between static web page and dynamic web page. **OR** Reema is a beginner student of networking and internet and is confused regarding the role of cookies. Explain the role of cookies to her.	2

20	The python code written below has syntactical errors. Rewrite the correct code and underline the corrections made.
	`import panda as pd`
	`L= [[10, 'nut', 35.7],`
	`[15, 'bolt', 49.2],`
		2

```
    [20, spanner, 42.3]]
df=pd.DataFrame(L, Index=['r1','r2','r3'],
  column=['icode','iname', 'price'])
print(df)
```

21 Consider the given SQL string: "KendriyaVidyalayaSangathan". Write suitable SQL queries for the following: (2)

i. Returns the position of the first occurrence of the substring **"ya"** in the given string.

ii. To extract the word "Vidya" from the string.

22 Predict the output of the given Python code: (2)

```
import pandas as pd
L=[11,22,33]
S = pd.Series(L)
S=S*2
print(S)
```

23 Write any two methods to reduce e-waste. (2)

24 Complete the given Python code to get the required output as: (2)

```
Kanha     Madhya Pradesh
Gir               Gujarat
dtype: object
```

```
import _______________
d = {'Corbett': 'Uttarakhand', 'Sariska': 'Rajasthan', 'Kanha': 'Madhya Pradesh',
'Gir':'Gujarat'}
NP = pd.Series(d)
print(_____________)
```

25 Explain using code example any two ways of using the count() function. (2)

SECTION C

26 Based on the SQL table TEACHER, write suitable queries for the following: (3)

Table : Teacher

T_ID	Name	Age	Department	Salary	Gender
1	Jugal	34	Computer Sc	12000	M
2	Sharmila	31	History	20000	F
3	Sandeep	32	Mathematics	30000	M
4	Sangeeta	35	History	40000	F
5	Rakesh	42	Mathematics	25000	M
6	Shyam	50	History	30000	M
7	Shiv Om	44	Computer Sc	21000	M
8	Shalakha	33	Mathematics	20000	F

	i. Display the number of teachers in each department.
	ii. Display the average salary of male and female teachers.
	iii. Display the details of teachers of 'Mathematics' department in descending order of salary.
	OR
	Predict the output of the following queries based on the table CAR_SALES given above:
	`i. SELECT MID(NAME,2,3)FROM TEACHER WHERE DEPARTMENT= 'HISTORY';`
	`ii.SELECTSALARY*0.1 "BONUS" FROM TEACHER WHERE DEPARTMENT= "COMPUTER SC";`
	`iii. SELECT COUNT(*) "TOP SAL" FROM TEACHER WHERE SALARY>25000;`	

27	Write a python program to create the following DataFrame object, df. df1= 2016 2017 2018 2019 columnlabels qtr1 10 5 7.0 10 qtr2 5 9 8.0 5 qtr3 6 3 NaN 4 qtr4 6 9 8.0 7 rowlabels	3
28	A departmental store MyStore is considering to maintain their inventory using SQL to store the data. As a database administer, Abhay has decided that: • Name of the database - storeDB • Name of the table - STORE • The attributes of STORE are as follows: ItemNo - numeric ItemName – character of size 20 Scode - numeric Quantity – numeric Write SQL Commands to: a) Create the database named storeDB b) Create the table named STORE.	3
29	Rishabh received an SMS on his smartphone with a link to update his details on his banks website. He updated his details but the next day somebody withdrew a large amount from his bank account. Based on the given information, answer the questions given below. i. Identify the type of cybercrime he is a victim of. ii. Under which act, she can lodge a complaint to the relevant authorities?	3

iii. Suggest her any two precautionary measures which she should take in future while being online to avoid any such situations.

OR

Mention any three ways in which the electronic wastes can be handled.

30 Consider the following dataframedf_sales 3

columns

	2017	2018	2019	2020
car	7	5	8	5
bike	10		7	3
truck	3	10	2	1

row labels

Write commands to-

1. Find the sales in the years 2018, 2019, 2020 for all types of vehicles
2. Find the sales of bike for the years 2017 and 2019.
3. Add new row for 'bicycle' with data as 2017-123, 2018-345, 2019-322, 2020-431.

SECTION D

31 Preetamis developing a software for a furniture manufacturing unit. Assist him by writing the following queries: 4

Table : Furniture

FCODE	NAME	PRICE	MANUFDATE	WCODE
10023	Coffee table	4000	19-DEC-2016	W03
10001	Dining table	20500	12-JAN-2017	W01
10012	Sofa	35000	06-JUN-2016	W02
10024	Chair	2500	07-APR-2017	W03
10090	Cabinet	18000	31-MAR-2015	W02

i. Write a query to display the name of furniture manufactured in the year 2017.

ii. Write a query to display the number of items having the word 'table' which are present in the shop.

iii. Write a query to display the position of the word 'in' within the names of furnitures.

iv. Write a query to display the last four characters of the names of the furnitures.

32 Consider the following DataFrame, df which shows the sales made by a vehicle showroom company with showrooms in different cities. Write python code(s) for the questions that follow. 4

```
df=
           numofemp  vehiclessold  totsales  totexp
mumbai           80            10      1012     780
delhi            40             5      2275    1526
chennai          30            17      3145     748
bangalore        20            21      2987     824
```

(a) Display the number of employees and the total sales for all the cities.
(b) Display all information for Mumbai, Chennai and Bangalore.
(c) Display the number of vehicles sold for delhi, Chennai and Bangalore.
(d) Display the number of employees and the total expenses for Mumbai, delhi and Bangalore.

SECTION E

33 Consider the table SALES and answer the questions that follow: 5

Table : SALES

SALESMANID	NAME	SALES	LOCATIONID
S1	ANITA SINGH ARORA	250000	102
S2	Y.P. SINGH	1300000	101
S3	TINA JAISWAL	1400000	103
S4	GURDEEP SINGH	1250000	102
S5	SIMI FAIZAL	1450000	103

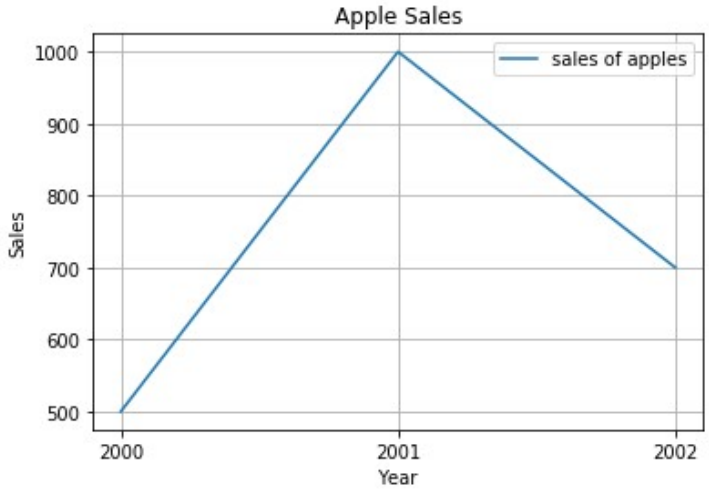
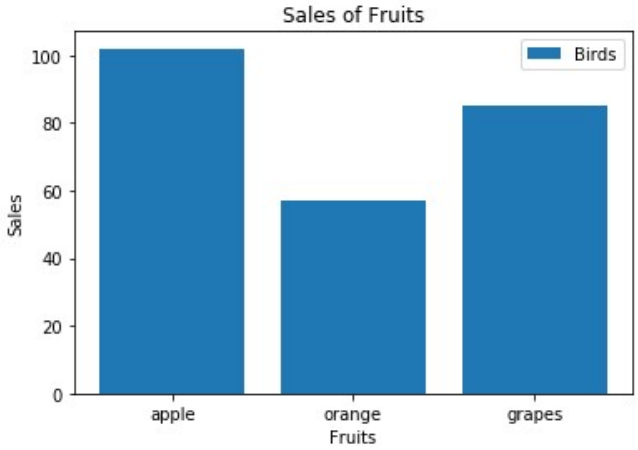
Write SQL queries for the following

(i) To display names of those salesmen who have 'SINGH' in their names.
(ii) Identify Primary key in the table SALES. Give reason for your choice.
(iii) Write SQL command to change the LocationID to 104 of the Salesman with ID as S3 in the table 'SALES'.
(iv) Delete the rows from the table for salesmen who have two I's in their names
(v) Add a column commission which can store decimal values to the table.

34 SAMAR Infotech Delhi and has 4 blocks named S1, S2, S3 and S4. The tables given below show the distance between different blocks and the number of computers in each block.

Distance between blocks
S1 to S2 – 20m
S2 to S3 – 120m
S3 to S4 – 90m
S4 to S1 – 70m
S1 to S3 – 40m
S4 to S2- 140m

Computers in each block
S1 – 93 computers
S2 – 15 computers
S3 – 45 computers
S4 – 25 computers

	The company is planning to form a network by joining these blocks. i. Identify the best location to place the server and give reasons for your selection. ii. Suggest a suitable cable layout between the blocks. iii. The company wishes to provide internet connectivity to all computers. Identify the device and where should the device be placed. iv. Further the company wants to add a device/software that will permit only authorized and valid communication between the internal company s computers and the computers on the internet. Suggest a suitable device/software. v. The company wants to establish a data link between the Delhi office and its office in London. Out of LAN, MAN, or WAN, what kind of network will be created? Justify your answer.	
35	For the graph shown below, write the code to display it using python matplotlib library. Also write suitable code to save this plot.  **OR** Write a program to display the following plot. Also write suitable code to save this plot.  	5

MARKING SCHEME
SAMPLE QUESTION PAPER
CLASS XII (2023-24)
INFORMATICS PRACTICES (065)

TIME: 03 HOURS **M.M.: 70**

General Instructions:

1. This question paper contains five sections, Section A to E.
2. All questions are compulsory.
3. Section A has 18 questions carrying 01 mark each.
4. Section B has 07 Very Short Answer type questions carrying 02 marks each.
5. Section C has 05 Short Answer type questions carrying 03 marks each.
6. Section D has 02 questions carrying 04 marks each.
7. Section E has 03 questions carrying 05 marks each.
8. All programming questions are to be answered using Python Language only.

	SECTION A	
1.	i. Hub **(1 mark for correct answer)**	1
2.	iii. Burn the old devices **(1 mark for correct answer)**	1
3.	i Trademark **(1 mark for correct answer)**	1
4.	ii. 12.72 **(1 mark for correct answer)**	1
5.	iii. mod() **(1 mark for correct answer)**	1
6.	ii. Mozilla Firefox **(1 mark for correct answer)**	1
7.	iii. read_csv **(1 mark for correct answer)**	1
8.	iii. `SELECT DEPT, COUNT(*) FROM EMP GROUP BY DEPT HAVING AVG(SAL)>20000;` **(1 mark for correct answer)**	1
9.	iii. rch **(1 mark for correct answer)**	1

10.	iv. NP.tail(10) **(1 mark for correct answer)**	1

11.	iii. append **(1 mark for correct answer)**	1
12.	i. A column must have homogenous data type **(1 mark for correct answer)**	1
13.	iv. None of above **(1 mark for correct answer)**	1
14.	iii. SUBSTR() **(1 mark for correct answer)**	1
15.	iii. Web Server **(1 mark for correct answer)**	1
16.	iv. Richard Stallman **(1 mark for correct answer)**	1
17.	i. Both A and R are true and R is the correct explanation for A **(1 mark for correct answer)**	1
18.	i. Both A and R are true and R is the correct explanation for A **(1 mark for correct answer)**	1
	SECTION B	
19.	In static web page the content remains the same whereas in dynamic web page the content can change. In static web page only html is used whereas in dynamic web page, in addition to html some scripting language is also used. **(1 mark each for each correct explanation)** **OR** Cookies are small text files that websites can use to store information about the pages and selections you have made on a website. For example when using email (e.g. gmail) you can log in the website once and then you can browse a related website (youtube) which remembers you and your preferences. **(1 mark for correct explanation)** **(1 mark for correct example)**	2

20.	import **pandas** as pd L= [[10, 'nut', 35.7], [15, 'bolt', 49.2], [20, **'spanner'**, 42.3]] df=pd.DataFrame(L, **index**=['r1','r2','r3'], **columns**=['icode','iname', 'price']) print(df) **(1/2 mark for each correction)**	2

21.	i. SELECT INSTR("KendriyaVidyalayaSangathan","ya");
	ii. SELECT SUBSTR("KendriyaVidyalayaSangathan",9,5);
	(1 mark for each correct query)
		2

22.	0 22 1 44 2 66 dtype: int64 **(2 marks for correct output)**	2
23.	• Sell/Donate your e-waste to someone in need. • Dispose e-waste to certified e-waste recycler **(2 marks for two points)**	2
24.	import **pandas as pd** d = {'Corbett': 'Uttarakhand', 'Sariska': 'Rajasthan', 'Kanha': 'Madhya Pradesh', 'Gir':'Gujarat'} NP = pd.Series(d) print**(NP[2:])** **(1/2 mark for each correct fill-up)**	2

25.	Count(*) can be used to count the number of rows
	e.g. select count(*) from student;
	
	Count(distinct columnname) can be used to count the different/unique values present in a particular column
	count(distinct class) from student;
	(1 mark for correct explanation)
	(1 mark for example)
		2

	SECTION C	

26.		**3**

```
i. SELECT DEPARTMENT, COUNT(*) FROM TEACHER GROUP BY
DEPARTMENT;
ii. SELECT GENDER, AVG(SALARY) FROM TEACHER GROUP BY
GENDER;
iii.SELECT * FROM TEACHER WHERE DEPARTMENT =
 'MATHEMATICS' ORDER BY SALARY DESC;
```

(1 mark for each correct query)

OR

i.

MID(NAME,2,3)
HAR
ANG
HYA

ii.

BONUS
1200
2100

iii.

TOP SAL
3

(1 mark each correct output)

27.		3

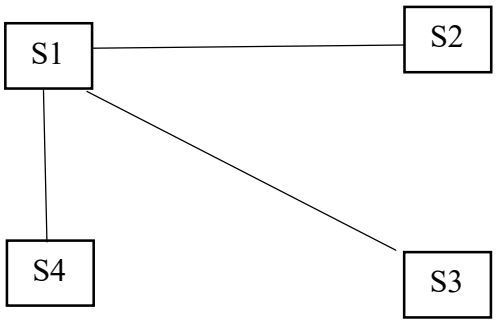
```
import pandas as pd
import numpy as np   #stmt1
d={2016:[10,5,6,6], 2017: [5,9,3,9],
2018:[7,8,np.NaN, 8], 2019:[10,5,4,7]}#stmt2
df=pd.DataFrame(d,index=["qtr1","qtr2","qtr3",
     "qtr4"])   #stmt3
print(df) #stmt4
```

(#Statement 1 & 4 – ½ mark each)
(#Statement 2 & 3 – 1 mark each)

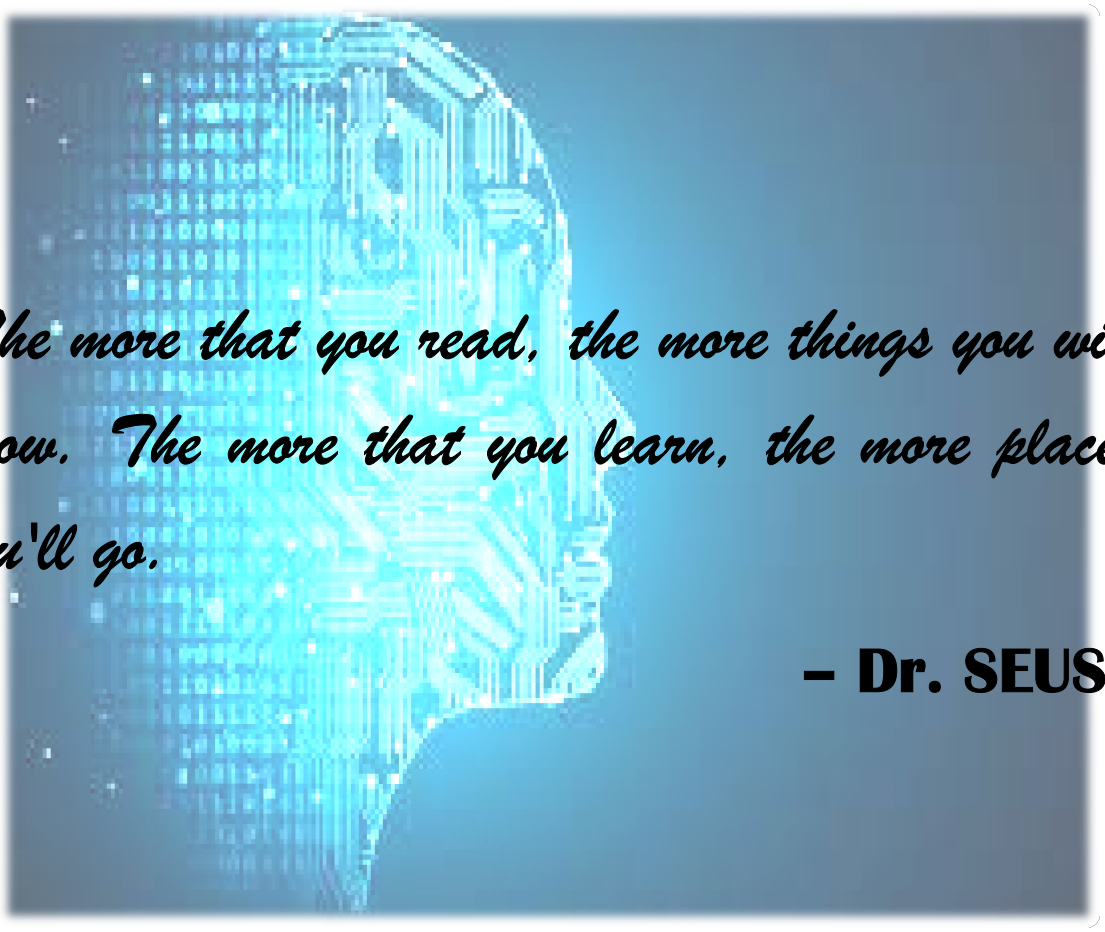
28.	i.CREATE DATABASE storeDB; **(1 mark for correct answer)** ii. CREATE TABLE STORE(ITEMNUMBER INT PRIMARY KEY,ITEMNAME CHAR(20), SCODE INT, QUANTITY INTEGER); **(½ mark for CREATE TABLE STORE** **1 mark each for correctly specifying each column** **½ mark for correctly specifying primary key)**	3
29.	i. She is a victim of Phishing. ii. Information Technology Act, 2000 (also known as IT Act). iii. a. Do not click on any suspicious link. b. Confirm personally with the bank if they have sent any such sms and report to the bank **(1 mark for each correct answer)** **OR** • Sell/Donate your e-waste to someone in need. • Dispose e-waste to certified e-waste recycler • Refurbish/Reuse the e-waste **(1 mark each for writing any 3 correct health hazards)**	3
30.	i.df_sales[[2018,2019,2020]] ii. df_sales.loc['bike', [2017,2019]] iii.df_sales.at['bicycle',:]=[123,345,322,431] **(1 mark for each correct statement)**	3
	SECTION D	

31.	i. SELECT NAME FROM FURNITURE WHERE YEAR(MANUFDATE)=2017;
	ii. SELECT COUNT(*) FROM FURNITURE WHERE NAME LIKE '%TABLE%';
	iii. SELECT INSTR(NAME,'IN') FROM FURNITURE;
	iv. SELECT RIGHT(NAME,4) FROM FURNITURE;
	(1 mark for each correct query)
		4

32.	i. df[['numofemp', 'totsales']] ii. df.loc[['mumbai','chennai','bangalore'], :] iii. df.iloc[1:, 1] iv. df.loc[['mumbai','delhi','bangalore'] , ['numofemp', 'totexp']] **(1 mark for each correct output/statement)**	4
	SECTION E	

33.	i. select name from sales where name like '%singh%'; ii. salesmanid column should be the primary key since all the values are unique. iii. Update sales set locationid=104 where salesmanid= 'S3'; iv. Delete from sales where name like '%I%I%'; v. Alter table sales add column commission float;	5
34.	i.ii. S1 as it has maximum number of computers.  	5
	iii. **Modem:**It should be placed in block S1 which houses the server iv. Gateway should be placed in S1 between modem and internal network v. WAN is formed over large distances. **(1 mark for each correct answer)**	

35.	import matplotlib.pyplot as plt #Statement 1
	x=[2000,2001,2002] #Statement 2
	y=[500,1000,700] #Statement 3
	plt.plot(x,y) #Statement 4 plt.title("Apple Sales") #Statement 5 plt.xlabel("Year")
	#Statement 6 plt.ylabel("Sales") #Statement 7
	plt.show()#Statement 8
	(½ mark each for each correct statement 1,2,4,5,6,7)
	plt.savefig("sales.jpg")
	
	(1 mark for the correct statement)
	OR
	import matplotlib.pyplot as plt #Statement 1
	x=['apple','orange','grapes']#Statement 2
	y = [100,60,80] #Statement 3
	plt.bar(x,y) #Statement 4 plt.title("Sale of Fruits")#Statement 5 plt.ylabel("Sales") #Statement 6
	plt.xlabel("Fruits") #Statement 7
	plt.show()#Statement 8
	(½ mark for each correct statement)
	plt.savefig("sales.jpg")
	(1 mark for the correct statement)
		5



'The more that you read, the more things you will know. The more that you learn, the more places you'll go.

– Dr. SEUSS