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CBSE 10 SAMPLE QUESTION PAPERS CLASS 12 INFORMATICS PRACTICES

Strictly based on CBSE Board Sample Paper 2023 issued on 16-9-2022

Design of the question paper issued by CBSE

Divisions	Typologies of Questions	No. of Questions	Marks	Total
Section A	MCQs + Assertion & Reasons	16 2	1×16=16 1×2=2	18 Marks
Section B	VSQS	7	2×7=14	14 Marks
Section C	SATQ	5	3×5=15	15 Marks
Section D	LATQ	3	5×3=15	15 Marks
Section E	Case based Questions	2	4×2=8	8 Marks
Total		35 Questions		70 Marks

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TABLE OF CONTENTS

❑❑

CBSE CIRCULAR 2022-23

केन्द्रीय माध्यमिक शिक्षा बोर्ड
CENTRAL BOARD OF SECONDARY EDUCATION

आज़ादी का अमृत महोत्सव

CBSE/DIR(ACAD)/2022/ **Dated: 20.05.2022**

Circular No. ACAD-57/2022

All Heads of schools affiliated to CBSE

Subject : Assessment and Evaluation Practices of the Board for the Session 2022-23

National Education Policy 2020 has affirmed the need to move from rote to competency-based learning. This will equip the learners with key competencies to meet the challenges of the 21st century proactively. Accordingly, the Board has taken multiple steps towards the implementation of Competency Based Education (CBE) in schools. These range from aligning assessment to CBE, development of exemplar resources for teachers and students on CBE pedagogy and assessment and continued teacher capacity building.

In this context the Board has released Circular No. Acad-05/2019 dated 18.01.2019; Circular No. Acad-11/2019 dated 06.03.2019; Circular No. Acad-18/2020 dated 16.03.2020; Circular No. Acad-32/2020 dated 14.05.2020 and Circular No. Acad-31/2020 dated 22.04.2021. In continuation to these circulars, the Board is initiating further corresponding changes in the Examination and Assessment practices for the year 2022-23 to align assessment to Competency Based Education. Therefore, in the forthcoming sessions a greater number of Competency Based Questions or questions that assess application of concepts in real-life/ unfamiliar situations will be part of the question paper.

The changes for classes IX-XII (2022-23) internal year-end/Board Examination are as detailed:

(Classes IX-XII)		
Year End Examination/ Board Examination (Theory)	(2021-22) Existing (As per Special Scheme of Assessment for Board Examination – Circular No. Acad-51/2021 dated 05.07.2021)	(2022-23) Modified (Annual Scheme)
Composition	• Term I – Multiple Choice Question including case based and assertion reasoning type MCQs – 100% (30% questions competency based) • Term II – Case based/ Situation based, Open Ended- short answer/long answer questions (30% questions competency based)	• Competency Based Questions would be minimum 40% These can be in the form of Multiple Choice Questions, Case based Questions, Source based Integrated Questions or any other types. • Objective Type Questions will be 20% • Remaining 40% short
Composition	• Term I – Multiple Choice Question including case based and assertion reasoning type MCQs – 100% (30% questions competency based) • Term II – Case based/ Situation based, Open Ended- short answer/long answer questions (30% questions competency based)	• Competency Based Questions would be minimum 40% These can be in the form of Multiple Choice Questions, Case based Questions, Source based Integrated Questions or any other types. • Objective Type Questions will be 20% • Remaining 40% short answer/long answer questions (as per existing pattern)
Internal Assessment : No change Internal Assessment: End of year examination = 20:80		
Year End Examination/ Board Examination (Theory)		

Curriculum document released by the Board vide circular No.Acad-50/2022 dated 28th April, 2022 and the forthcoming Sample Question Papers may be referred for the details of changes in the QP design of individual subjects.

(Dr. Joseph Emmanuel)
Director (Academics)

SYLLABUS

INFORMATICS PRACTICES (Code No.- 065)

CLASS-XII

1. Prerequisite: Informatics Practices – Class XI

2. Learning Outcomes

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

- Create Series, Data frames and apply various operations.
- Perform aggregation operations, calculate descriptive statistics.
- Visualize data using relevant graphs.
- Design SQL queries using aggregate functions.
- Import/Export data between SQL database and Pandas.
- Learn terminology related to networking and the internet.
- Identify internet security issues and configure browser settings.
- Explain the impact of technology on society including gender and disability issues.

3. Distribution of Marks and Periods

Units No.	Unit Name	Marks	Periods Theory	Periods Practical	Total Period
1.	Data Handling using Pandas and Data Visualization	30	50	40	90
2.	Database Query using SQL	25	30	22	52
3.	Introduction to Computer Networks	7	12	2	14
4.	Societal Impacts	8	14	–	14
	Project	–	–	10	10
	Practicals	30	–	–	–
	TOTAL	100	106	74	180

4. Unit Wise syllabus

Unit 1 : Data Handling using Pandas and Data Visualization

Data Handling using Pandas -I

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

SYLLABUS

Data handling using Pandas – II

- Descriptive Statistics: max, min, count, sum, mean, median, mode, quartile, Standard deviation, variance.
- Data Frame operations: Aggregation, group by, Sorting, Deleting and Renaming Index, Pivoting.
- Handling missing values – dropping and filling.
- Importing/Exporting Data between MySQL database and Pandas.

Data Visualization:

- Purpose of plotting, drawing and saving of plots using Matplotlib (line plot, bar graph, histogram, pie chart, frequency polygon, box plot and scatter plot).
- Customizing plots: color, style (dashed, dotted), width; adding label, title, and legend in plots.

Unit 2 : Database Query using SQL

- 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.
- Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN (Cartesian Join, Equi Join, Natural Join)

Unit 3 : Introduction to Computer Networks

- Introduction to networks, Types of network: 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.

5. Project Work

The aim of the class project is to create tangible and useful IT applications. The learner may identify a real-world problem by exploring the environment. e.g. Students can visit shops/business places, communities or other organizations in their localities and enquire about the functioning of the organization,

and how data are generated, stored and managed. The learner can take data stored in a csv or database file and analyze it using Python libraries and generate appropriate charts to visualize. If an organization is maintaining data offline, then the learner should create a database using MySQL and store the data in tables. Data can be imported in Pandas for analysis and visualization.

Learners can use Python libraries of their choice to develop software for their school or any other social good. Learners should be sensitized to avoid plagiarism and violation of copyright issues while working on projects. Teachers should take necessary measures for this. Any resources (data, image etc.) used in the project must be suitably referenced.

The project can be done individually or in groups of 2 to 3 students. The project should be started by students at least 6 months before the submission deadline.

6. Distribution of Practical Marks

S.No.	Unit Name	Marks
1.	Programs using Pandas and Matplotlib	8
2.	SQL Queries	5
3.	Practical file (minimum of 20 programs based on Pandas , 5 based on Matplotlib and 20 SQL queries must be included)	5
4.	Project Work (using concepts learned in class XI and XII)	7
5.	Viva-Voce	5
	Total	30

7. Suggested Practical List

7.1 Data Handling

1. Create a pandas series from a dictionary of values and an ndarray
2. Given a Series, print all the elements that are above the 75th percentile.
3. Create a Data Frame quarterly sales where each row contains the item category, item name, and expenditure. Group the rows by the category, and print the total expenditure per category.
4. Create a data frame based on ecommerce data and generate descriptive statistics (mean, median, mode, quartile, and variance)
5. Create a data frame for examination result and display row labels, column labels data types of each column and the dimensions
6. Filter out rows based on different criteria such as duplicate rows..
7. Find the sum of each column, or find the column with the lowest mean.
8. Locate the 3 largest values in a data frame.
9. Subtract the mean of a row from each element of the row in a Data Frame.
10. Replace all negative values in a data frame with a 0.
11. Replace all missing values in a data frame with a 999.
12. Importing and exporting data between pandas and CSV file
13. Importing and exporting data between pandas and MySQL database

SYLLABUS

7.2 Visualization

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

7.3 Data Management

17. Create a student table with the student id, name, and marks as attributes where the student id is the primary key.
18. Insert the details of a new student in the above table.
19. Delete the details of a particular student in the above table.
20. Use the select command to get the details of the students with marks more than 80.
21. Create a new table (order ID, customer Name, and order Date) by joining two tables (order ID, customer ID, and order Date) and (customer ID, customer Name, contact Name, country).
22. Create a foreign key in one of the two tables mentioned above
23. Find the min, max, sum, and average of the marks in a student marks table.
24. Find the total number of customers from each country in the table (customer ID, customer Name, country) using group by.
25. Create a new table (name, date of birth) by joining two tables (student id, name) and (student id, date of birth).
26. Write a SQL query to order the (student ID, marks) table in descending order of the marks.

7.4 Introduction to Computer Networks

27. Download, install and configure browser.

Reference:

NCERT Informatics Practices - Text book for class - XII

❑❑

Solved Paper, 2022
Informatics Practices
(Term–II)

Series : A5BAB/5 | **Paper Code : 35**

Time : 2 Hrs | **Maximum Marks : 35**

General Instructions:

Read the following instructions carefully.

*(i) This question paper is divided into **three sections : A, B** and **C**.*

*(ii) **Section A,** consists **7** questions **(1-7)**. Each question carries **2** marks.*

*(iii) **Section B,** consists **3** questions **(8-10)**. Each question carries **3** marks.*

*(iv) **Section C,** consists **3** questions **(11-13)**. Each question carries **4** marks.*

*(v) Internal choices have beeen given for question numbers - **1, 3, 7, 8 and 12.***

SECTION A

(Each question carries 2 marks)

1. Rushil thought 'WWW' and 'internet' are synonyms i.e., they meant same and can be used interchangeably. But the teacher said that they are not same. Help him to understand the meaning of both the terms with the help of a suitable example of each. **[2]**

OR

What are cookies? How can we disable cookies?

2. **(i)** What is the function of a gateway? **[1]**

(ii) Given examples of any tow plug-ins. **[1]**

3. Find the output of the following SQL queries: **[2]**

(i) SELECT ROUND (7658.345,2);

(ii) SELECT MOD (ROUND (13.9,0),3);

OR

Give any two differences between the POWER ( ) and SUM ( ) SQL functions.

4. Give one advantage and disadvantage each of Bus and Star topology. **[2]**

5. Find the output of the following SQL queries: **[2]**

(i) SELECT SUBSTR ("FIT INDIA MOVEMENT",5);

(ii) SELECT INSTR ("ARTIFICIAL INTELLIGENCE","IA");

6. Srikanth created the following table STUDENT in his database.

Table : STUDENT

RollNo	Name	Class	Marks
1	Ritika	12	40
2	Angad	12	35
3	Kaveri	11	42
4	Lalitha	12	21
5	Daniel	11	44
6	Rabindra	11	39
7	Rabia	11	28

He now wants to count number of students in each class where the number of students is more than 3. He has executed the following query:

SELECT MAX (Marks) FROM STUDENT WHERE COUNT (*)> 3 GROUP BY Class;

But, he got an error. Identify the error(s) and rewrite the query. Also underline the correction(s) done. **[2]**

7. MS.Mohini is working in a school and stores the deatails of all students in a table **SCHOOLDATA**.

TABLE: SCHOOLDATA

Admno	Name	Class	House	Percent	Gender	DOB
20150001	Aditya Das	10	Green	86	Male	2006-02-20
20140212	Harsh Sharma	11	Red	75	Male	2004-10-05
20090234	Swapnil Pant	10	Yellow	84	Female	2005-11-21
20130216	Soumen Rao	9	Red	91	Male	2006-04-10
20190227	Rahil Arora	10	Blue	70	Male	2005-05-14
20120200	Akasha Singh	11	Red	64	Female	2004-12-16

Write SQL statements from the above given table to:

(i) To remove leading spaces from the column Name.

(ii) Display the names of students who were born on Sunday.

OR

Predict the output if the following SQL queries frome the given table: **SCHOOLDATA**

(i) **SELECT MAX** (Percent) **FROM** SCHOOLDATA;

(ii) **SELECT LEFT** (Gender,1), Name **FROM** SCHOOLDATA **WHERE YEAR** (Dob)=2005;

SECTION B

(Each question carries 3 marks)

8. **Predict the output of the following SQL queries :** **[3]**

(i) SELECT TRIM (" ALL THE BEST ");

(ii) SELECT POWER (5,2);

(iii) SELECT UPPER (MID("Start up india"10));

OR

Consider a table **"MYPET"** With the following data :

Table: MYPET

Pet_id	Pet_Name	Breed	LifeSpan	Price	Discount
101	Rocky	Labrador Retriver	12	16,000	5
202	Duke	German Shepherd	13	22,000	10
303	Oliver	Bulldog	10	18,000	7
404	Cooper	Yorkshire Terrier	16	20,000	12
505	Oscar	Shih Tzu	NULL	25,000	8

Write SQL queries for the following :

(i) Display the Breed of all the pets in uppercase.

(ii) Display the total price of all the pets.

(iii) Display the average life span of the pets.

9. Write the names of SQL function to perform the following operation : **[3]**

(i) Diplay name of the Month from your date of birth.

(ii) Convert email-id to lowercase.

(iii) Count the number of characters in your name.

10. Consider the following table : **PRODUCT**

TABLE: PRODUCT

PID	PNAME	PRICE	QUANTITY
P1001	Eraser	10.50	5
P1002	Ball pen	15.00	2
P1003	Gel pen	25.10	3
P1004	Ruler	5.00	1

Find the output of the following SQL queries;

(i) SELECT 10+MOD (QUANTITY,3) FROM PRODUCT WHERE PNAME="Eraser";

(ii) SELECT ROUND (PRICE,2)*QUANTITY FROM PRODUCT WHERE QUANTITY>2;

(iii) SELECT UCASE (RIGHT(PNAME,2)) FROM PRODUCT;

SECTION C

(Each question carries 4 marks)

11. Consider the table: ITEM **[4]**

Table: ITEM

SNo	Itemname	Type	Price	Stockdate
1.	Chaises	Living	11500.58	2020-02-19
2.	Accent Chairs	Living	31000.67	2021-02-15
3.	Baker Racks	Kitchen	25000.623	2019-01-01
4.	Sofa	Living	7000.3	2020-10-18
5.	Nightstand	Bedroom	NULL	2021-07-23

Write SQL queries for the following :

(i) Display all the records in descending order of Stockdate.

(ii) Display the Type and total number of items of each type.

(iii) Display the least prise.

(iv) Display the Item name with their price rounded to 1 decimal place.

12. Consider the following table: **[4]**

Table: SALESMAN

Scode	Sname	Area	Qtysold	Dateofjoin
S001	Ravi	North	120	2015-10-01
S002	Sandeep	South	105	2012-08-01
S003	Sunil	NULL	68	2018-02-01
S004	Subh	West	280	2010-04-01
S005	Ankit	East	90	2018-10-01
S006	Raman	North	NULL	2019-12-01

Predict the output for the following SQL queries :

(i) **SELECT MAX** (Qtysold), **MIN**(Qtysold) **FROM** SALESMAN;

(ii) **SELECT COUNT**(Area) **FROM** SALESMAN;

(iii) **SELECT LENGTH** (Sname) **FROM** SALESMAN **WHERE MONTH** (Dateofjoin)=10;

(iv) **SELECT** Sname **FROM** SALESMAN **WHERE RIGHT** (Scode,1)=5;

OR

Based on the given table **SALESMAN** Write SQL queries to perform the following operations : **[4]**

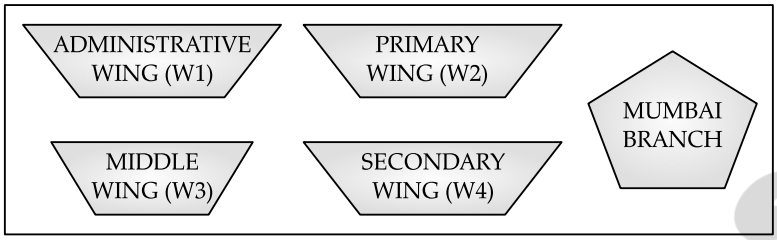
(i) Count the total number of salesman.

(ii) Display the maximum qtysold from each area.

(iii) Display the average qtysold from each area where number of salesman is more than 1

(iv) Display all the recorder in ascending order of area.

13. ABC International school, Delhi has different wings Administrative Wing (W1), Primary Wing (W2), Middle Wing (W3), and Secondary Wing (W4), as shown in the diagram: **[4]**



The school also has a branch in Mumbai. The school management wants to connect all the wings as well as all the computers of each wing (W1,W2,W3,W4)

Distance between the wings are as follows :

W3 to W1	85 m
W1 to W2	40 m
W2 to W4	25 m
W4 to W3	120 m
W3 to W2	150 m
W1 to W4	170 m

Number of computers in each of the wing :

W1	125
W2	40
W3	42
W4	60

Based on the above specifications, answer the following questions:

(i) Suggest the topology and draw the most suitable cable layout for connecting all the wings of Delhi branch.

(ii) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting

(a) Administrative Wing (W1) With Middle Wing (W3)

(b) Administrative Wing (W1) With the Mumbai Branch.

(iii) Suggest the placement of the following devices with Justification :

(a) Repeater

(b) Switch/ Hub

(iv) Due to pandemic school had to adopt Online classes. Suggest the protocol that is used for sending the voice signals over internet. Also, give an example of an application of WWW that helped the teachers to send messages instantly to the students.

●●

ANSWERS

Section - A

1. Internet is entirely different from WWW. It is a worldwide network of devices like computers, laptops, tablets, etc. It enables users to send emails to other users and chat with them online. For example, when you send an email or chatting with someone online, you are using the internet.
But, when you have opened a website like google.com for information, you are using the World Wide Web; a network of servers over the internet.

OR

Cookies are files created by websites you visit. They make your online experience easier by saving browsing information. With cookies, sites can keep you signed in, remember your site preferences, and give you locally relevant content.
Steps to disable Cookies in browser (e.g. Chrome)

(i) On your computer, open Chrome.
(ii) At the top right, click More and then Settings.
(iii) Under "Privacy and security," click Site settings.
(iv) Click Cookies.
(v) From here, you can:

- Turn on cookies: Next to "Blocked," turn on the switch.
- Turn off cookies: Turn off Allow sites to save and read cookies data.

2. **(i)** A gateway is a network node used in telecommunications that connects two networks with different transmission protocols together. Gateways serve as an entry and exit point for a network as all data must pass through or communicate with the gateway prior to being routed.
(ii) Adobe Flash Player, a Java virtual machine (for Java applets)

3. **(i)** 7658.35
(ii) 2

OR

Differences between POWER() and SUM() are as follows

POWER()	SUM()
POWER() function is used to returns m raised to the nth power.	SUM() function is used to return the summed value of an expression.
Syntax: POWER(m, n) Returns: Value of m raised to the nth power.	Syntax: SELECT SUM(aggregate_expression) FROM tables [WHERE conditions]; Returns: The summed value of an expression.

4. **Bus Topology**

Advantage: It is easy to connect or remove devices in this network without affecting any other device.

Disadvantage: Identification of problems becomes difficult if the whole network goes down.

Star topology

Advantage: It is high-performing as no data collisions can occur.

Disadvantage: If hub goes down everything goes down, none of the devices can work without hub.

5. **(i)** INDIA MOVEMENT
(ii) 8

6. SELECT, COUNT(Name) FROM STUDENT GROUP BY Class HAVING COUNT(*) > 3;

7. **(i)** SELECT LTRIM (Name) FROM SCHOOLDATA;

(ii) SELECT Name FROM SCHOOLDATA WHERE DAYNAME(Dob)="SUNDAY";

OR

(i)

Percent
91

(ii)

Gender	**Name**
F	Swapnil Pant
M	Rahil Arora

Section - B

8. **(i)** ALL THE BEST

(ii) 25

(iii) INDIA

OR

(i) SELECT UPPER(Breed) FROM MYPET;

(ii) SELECT SUM(Price) FROM MYPET;

(iii) SELECT AVG(LifeSpan) FROM MYPET;

9. **(i)** MONTHNAME()

(ii) LOWER()

(iii) LEN() /LENGTH( )

10. **(i)** 12

(ii) 52.50
75.30

(iii) ER
EN
EN
ER

Section - C

11. **(i)** SELECT * FROM ITEM ORDER BY Stockdate DESC;

(ii) SELECT Type, COUNT(Itemname) FROM ITEM GROUP BY Type;

(iii) SELECT MIN (Price) FROM ITEM;

(iv) SELECT Itemname, ROUND (Price, 1) FROM ITEM;

12. **(i)** 280 68

(ii) 5

(iii) 4
5

(iv) Ankit

OR

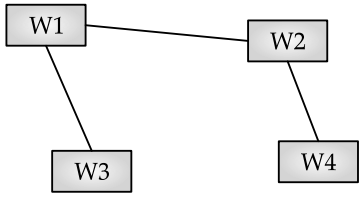
(i) SELECT COUNT(Sname) FROM SALESMAN;

(ii) SELECT Area, MAX(Qtysold) FROM SALESMAN GROUP BY Area;

(iii) SELECT Area, AVG(Qtysold) FROM SALESMAN GROUP BY Area HAVING COUNT(*) > 1;

(iv) SELECT * FROM SALESMAN ORDER BY Area;

13. **(i)** Star topology



(ii) **(a)** LAN

(b) WAN

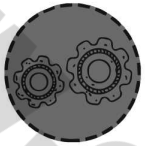
(iii) **(a)** Repeater should be placed in between wings W3 to W2 and W1 to W4 as distance is more.

(b) Hub/Switch should be placed in each wing to connect various computers together.

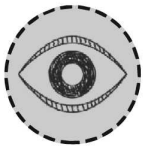
(iv) **Protocol :** VoIP

Example to send messages instantly: WhatsApp

MIND MAPS
Learning Made Simple



anytime, as frequency as you like till it becomes a habit!



Presenting words and concepts as pictures!!

When?

What?

MIND MAP
AN INTERACTIVE MAGICAL TOOL

Why?

- To Unlock the imagination and come up with ideas
- To Remember facts and figures easily
- To Make clearer and better notes
- To Concentrate and save time
- To Plan with ease and ace exams

Result

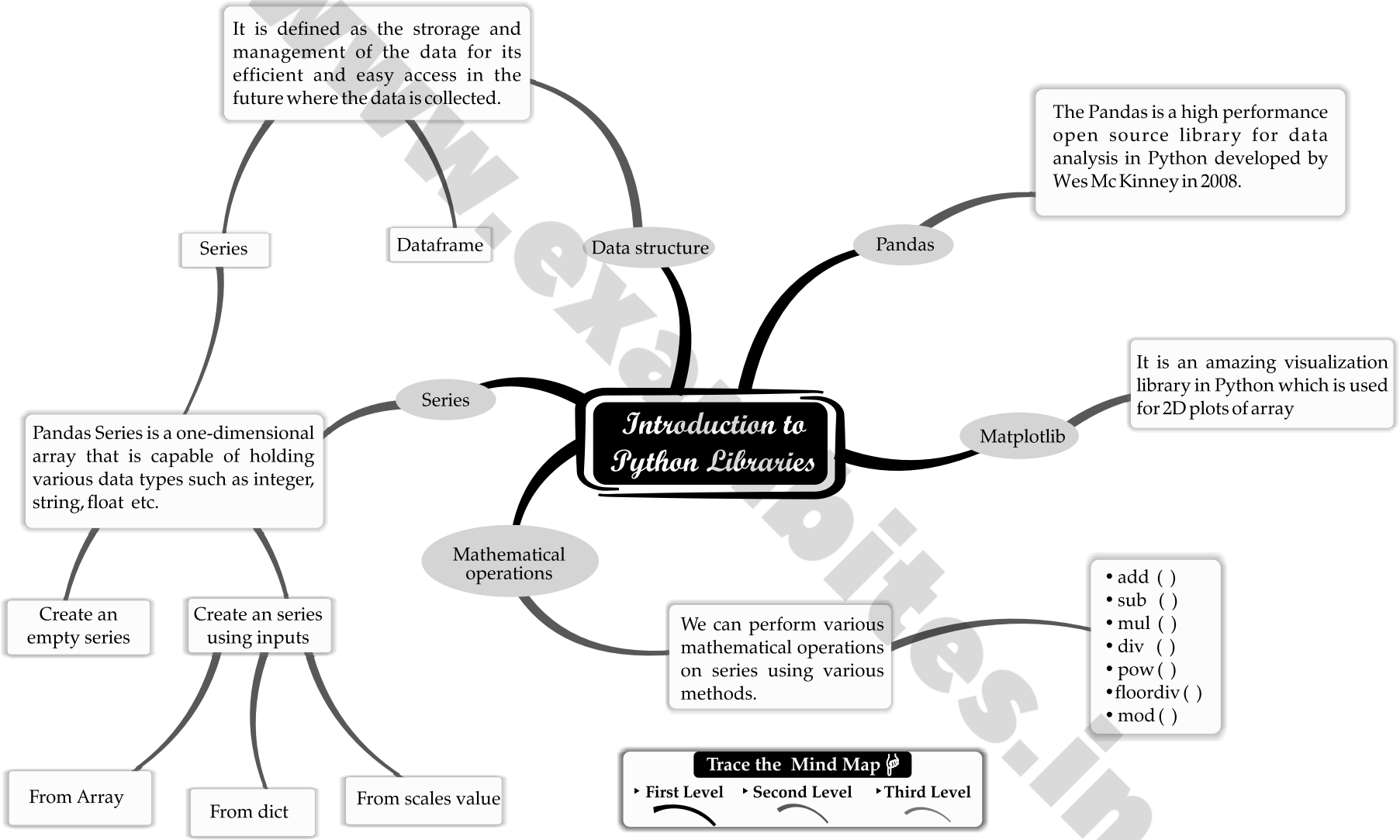
Learning made simple
'a winning combination'

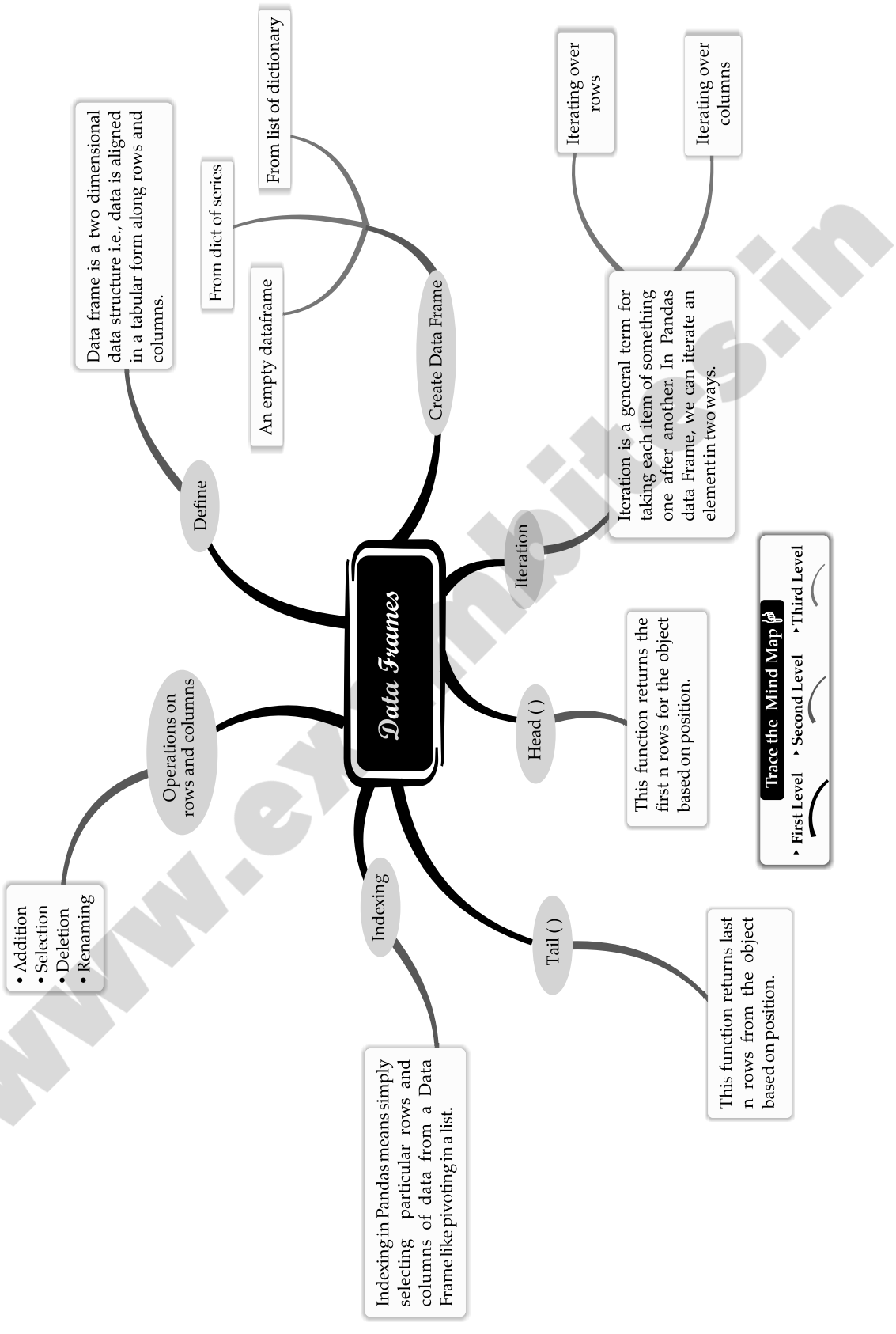
How?

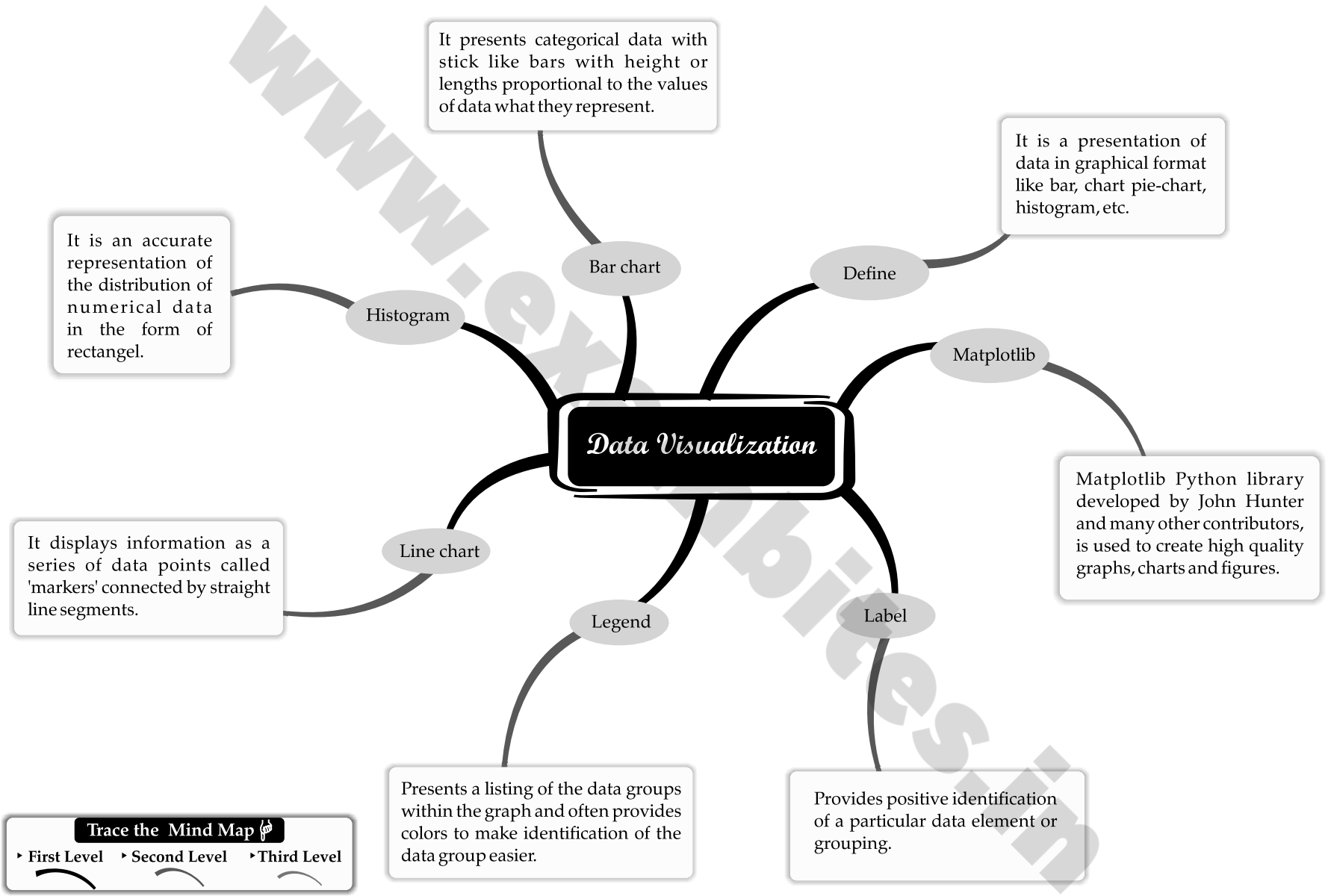
With a blank sheet of paper coloured pens and your creative imagination!

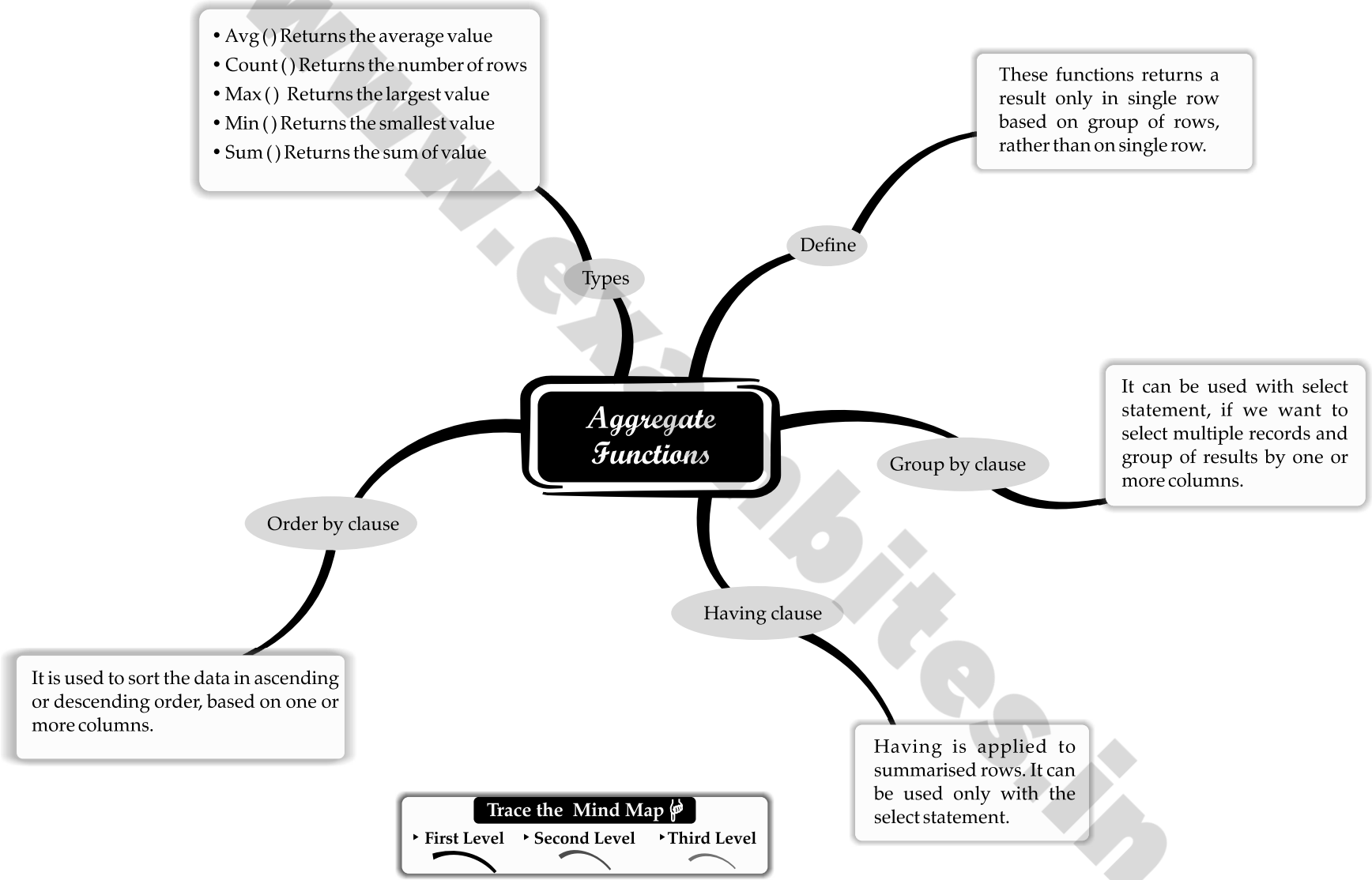
What are Associations?

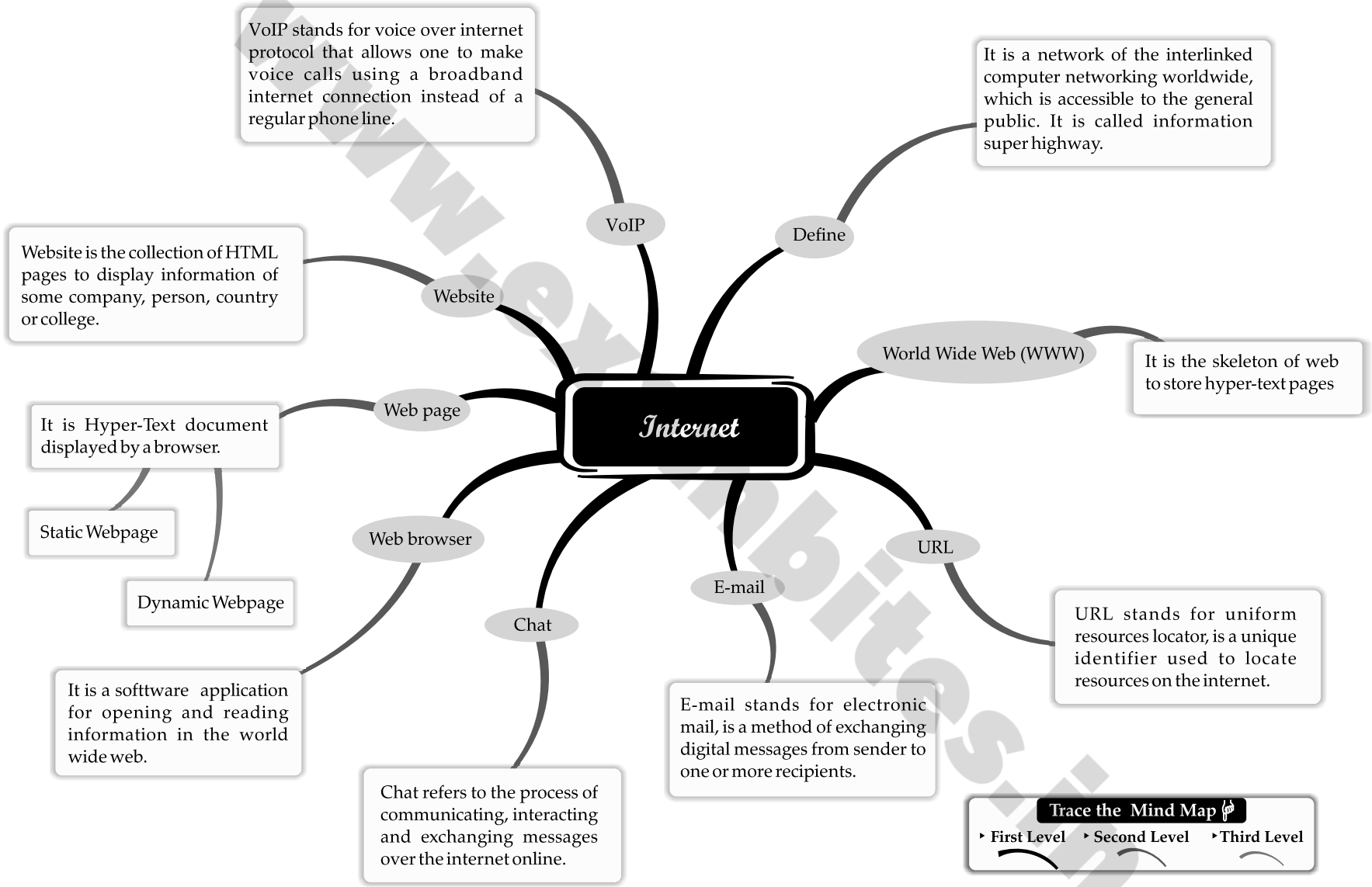
It's a technique connecting the core concept at the Centre to related concepts or ideas. Associations spreading out straight from the core concept are the First Level of Association. Then we have a Second Level of Association emitting from the first level and the chronology continues. The thickest line is the First Level of Association and the lines keep getting thinner as we move to the subsequent levels of association. This is exactly how the brain functions, therefore these Mind Maps. Associations are one powerful memory aid connecting seemingly unrelated concepts, hence strengthening memory.

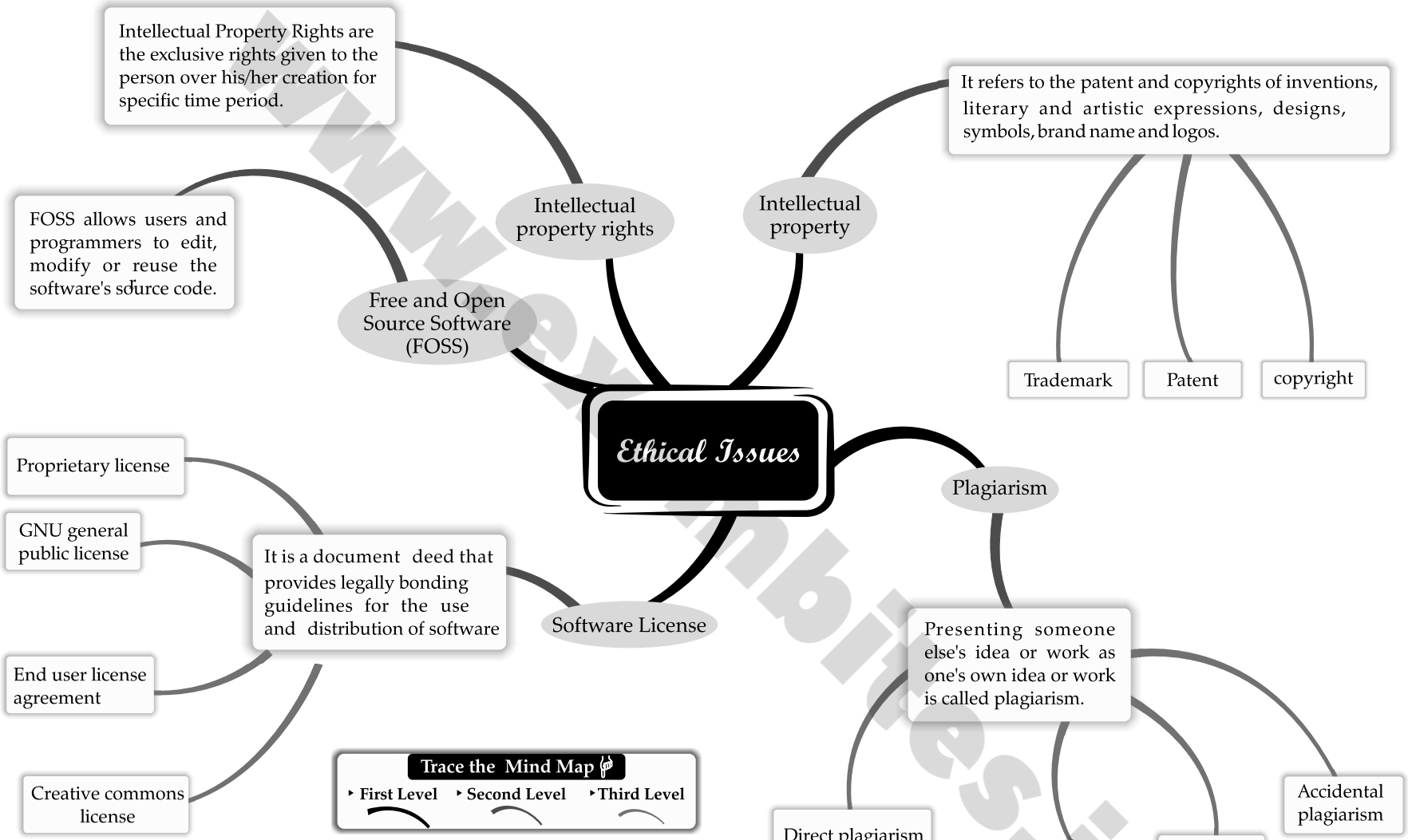












ON TIPS NOTES

Note making is a skill that we use in many walks of life : at school, university and in the world of work. However, accurate note making requires a thorough understanding of concepts. We, at Oswaal, have tried to encapsulate all the chapters from the given syllabus into the following ON TIPS NOTES. These notes will not only facilitate better understanding of concepts, but will also ensure that each and every concept is taken up and every chapter is covered in totality. So go ahead and use these to your advantage.... go get the **OSWAAL ADVANTAGE!!**

CHAPTER 1 : Data Handling Using Pandas-I

Introduction To Python Libraries

- **Pandas**
  - The Pandas is a high-performance open source library for data analysis in Python, developed by Wes McKinney in 2008. Over the years, it has become the de-facto standard library for data analysis using Python.
  - Using the Pandas, we can accomplish five typical steps in the processing and analysis of data, regardless of the origin of data. These steps are load, prepare, manipulate, model and analyze.
- **Matplotlib**
  - It is an amazing visualization library in Python that used for 2D plots of arrays. It is multi-platform data visualization library which build NumPy arrays. Matplotlib produces publication-quality figures in a variety of hardcopy formats and interactive environments across platforms.
  - Matplotlib can be used in Python scripts, the Python and IPython shell, web application servers and various graphical user interface toolkits. To get matplotlib up and running in our environment, we need to import it.
- **Data Structures in Pandas**
  - Data structure is defined as the storage and management of the data for its efficient and easy access in the future where the data is collected, modified and the various types of operations are performed on the data respectively. Pandas provides two data structures for processing the data, which are explained below :
    (1) **Series**: It is one dimensional object similar to an array, list or column in a table. It will assign a labeled index to each item in the series. By default, each item will receive an index label from 0 to N, where N is the length of the series minus one.
    (2) **Data Frame**: It is a tabular data structure comprised of rows and columns. It is defined as a standard way to store data which has two different indexes i.e., row index and column index.
- **Series**
  - Pandas series is one-dimensional array that is capable of holding various data types such as integer, string, float, object etc. With the help of series () method, we can easily change the list, dictionary into series. A series does not contain multiple columns and rows. Labels of series are called index.

    Syntax

    pandas. Series (data, index, dtype, copy)
- **Mathematical Operations**
  - We can perform mathematical operation on series like addition, subtraction, multiplication, division, etc.

For this, various methods are used, as follows:

- **add()** : This function is used to add series and others, element-wise (binary operator add).
  Syntax : Series.add(self, other, level=None, fill_value=None, axis=0)
  Here, other is series or scalar value fill_value is None or float value but its default value is None
- **sub()** : This function is used to get subtraction of series and other, element-wise.
  Syntax : Series.sub(self, other, level=None, fill_value=None, axis=0)
- **mul() :** This function is used to get multiplication of series and others, element-wise.
  Syntax : Series.mul (other, fillvalue=None, axis=0)

- **div() :** This function is used to get floating division of series and other, element-wise.
  Syntax : Series.div(self, other, level=None, fill_value=None, axis=0)
- **pow()** : This function is used to get exponential power of series and others, element-wise.
  Syntax : Series.pow(self, other, level=None, fill_value=None, axis=0)

➢ **Selection**

- In series, Series.select() function is used for selection. This function returns data corresponding to axis labels matching criteria. We pass the name of the function as an argument to this function which is applied on all the index tables. The index labels satisfying the criteria are selected.
  Syntax : Series.select (crit, axis=0)

➢ **Indexing**

- The object supports both integers and label based indexing and provides a host of methods for performing operation involving the index.
- In Python Pandas, Series.index attribute is used to get or set the index labels of the given series object.
  Syntax : Series.index

➢ **Slicing**

- Slicing is a powerful approach to retrieve subsets of data from a Pandas object. A slice object is built using a syntax of start : end : step, the segments representing the first item, last item and the increment between each item that you would like as the step.

Data Frames & Operation on Rows and Columns

➢ **Data Frames**

- Data Frame is a two dimensional data structure i.e., data is aligned in a tabular form as rows and columns. It consists of various properties as iteration, indexing, etc.
- In data frame, columns can be heterogeneous types like integer, boolean, etc.
- It can be seen as a dictionary of series where rows and columns both are indexed.
- Data Frame can be created using following syntax :
  pandas. DataFrame (data, index, columns, dtype, copy).

➢ **Iterating in Pandas DataFrame**

Iteration is a general term for taking each item of something. We can iterate an element in two ways :

(i) Iterating over rows: There are three functions to iterate over rows as follows :

- iterrows() : It returns the iterator yielding each index value along with a series containing the data in each row.
- iteritems() : It iterates over each column as key, value pair with label as key and column value as series object.
- itertuples() : It returns a tuple for each row. The first element of the tuple will be the row's corresponding index value, while the remaining values are the rows values.

(ii) Iterating over columns: In order to iterate over columns, we need to create a list of dataframe columns and then iterate through that list to pull out the dataframe columns.

➢ **Operations on Rows and Columns**

- As we know, DataFrame is a two dimensional data structure means data is arranged in a tabular format like rows and columns, some basic operations can be perform like adding, deleting, selecting and renaming. These operations are as follows:

(i) Addition

- To add a column in Pandas Dataframe, a new list as a column can be declared and add to an existing DataFrame.
- To add a row in Pandas DataFrame, we can concate the old dataframe with new one.

(ii) Selection

- To select a column in Pandas DataFrame, we can either access the columns by calling them by their column names.
- To retrieve rows from a DataFrame, a special method is used named DataFrame.loc[]. Rows can also be selected by passing integer location to iloc[] method.

(iii) Deletion

- To delete a column from Pandas DataFrame, drop() method is used. Columns are deleted by dropping columns with column names.
- To delete a row from Pandas DataFrame, drop() method is used. Rows are deleted by dropping rows by index label.

- **Boolean Indexing**
  - It helps us to select the data from the DataFrames using a boolean vector. We need a DataFrame with a Boolean index to use the boolean indexing.
  - In boolean indexing, we can filter a data in four ways :
    - Accessing a DataFrame with a boolean index
    - Applying a boolean mask to a dataFrame
    - Masking data based on column value
    - Masking data based on index value
- **CSV File**
  - A CSV is a comma-separated values file. This type of file can be view as an excel file and separated by commas. CSV file is nothing more than a simple text file. However, it is the most common, simple and easiest method to store tabular data. This particular format arranges tables by a specific structure divided into rows and columns.
  - Once we have the DataFrame, we can persist it in CSV on the local disk. Let's first create CSV file using data that is currently present in the DataFrame, we can store the data of this DataFrame in CSV format using API called to_CSV (…) of Pandas

CHAPTER 2 : 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.
- **Plotting using Matplotlib**
  - The Matplotlib Python library, developed by John Hunter and many other contributors, is used to create high quality graphs, charts and figures.
  - Matplotlib produces publication quality figures in a variety of hardcopy format and interactive environments across platforms. It can be used in Python scripts, the Python and IPython shell, web application servers and various graphical user interface toolkits.
  - For installation of Matplotlib in various operating system such as windows, Linux, MacOS, etc., use following command at command prompt :

    python -m pip install -U matplotlib
- **Line Plot**
  - For all matplotlib plots, we start by creating a figure and axes.
  - The figure (an instance of the class plt.Figure) can be thought of as a single container that contains all the objects represented axes, graphics, text and labels. The axis (an instance of the class plt.Axes) is a bounding box with ticks and labels, which will eventually contain the plot elements that make up our visualization. If we want to create a single figure with multiple lines, we can simple call the plot function multiple times.
- **Plotting Bar graph**
  - Categorical data can be represented in rectangular blocks with different heights or lengths proportional to the values. Such a type of representation is called a bar chart. The bar chart can be plotted vertically or horizontally.
  - A bar graph uses bars to compare data among different categories.
- **Plotting Histogram**
  - A histogram is an accurate representation of the distribution of numerical data. It uses rectangle to represent data. Histograms are used to show a distribution. A probability distribution can be estimated using a histogram plot.
- **Customizing Plots**
  - You can customise the charts or graphs with proper details. The graph or plot should have a proper title, labels, legends, etc.
    - Adding a tittle: To add a tittle in chart or graph title() function is used.

      Syntax

      <matplotlib.pyplot>.title(title_string)
    - Adding Labels: To set the labels for X-axis and Y-axis, xlable() and ylabel() are used respectively.
    - Adding Legends: When we plot multiple ranges on a single plot, it becomes necessary that legends are specified. To add legend to the plot, legend( ) function is used.

      Syntax <matplotlib.pyplot>.legend(loc = <string or position no>)

CHAPTER 3 : DATABASE QUERY USING SQL

Built-In Functions

➢ **Mathematical Functions**

- There are various built-in functions available in MySQL for mathematical calculations. These mathematical functions accept numeric value, perform some operations on it and also return numeric value in result.
- Some mathematical functions used in MySQL are as follows :
  - ❐ **POWER( )** : This function is used to get the power of the given values.
    Syntax :
    POWER (m, n)
    Parameter :
    m : It is a base value in the calculation
    n : It is exponent value in the calculation
    This function returns m raised to the nth power
  - ❐ **ROUND( )** : This function is used to round up the number to the upwards or downwards whichever the nearest whole number.
    Syntax :
    ROUND(number)
    If you want to get number with certain number of decimal places, you can also pass that number, and use following syntax.
    ROUND (number, decimal place)
  - ❐ **MOD( )** : This function is used to return the remainder of one expression by dividing it to another expression.
    Syntax:
    MOD(n, m)
    Parameter :
    n : number to be divided by m
    m : number that will divide n

➢ **Text Functions**

- MySQL text functions manipulate the character string data effectively. Some text functions used in MySQL are as follows:
  - ❐ **UCASE()/UPPER()**: This function is used to convert the string argument into upper case characters.
    Syntax:
    UCASE(str)
    OR
    UPPER(str)
  - ❐ **LCASE( )/LOWER()** : This function is used to convert the characters of an argument string to the lowercase characters.
    Syntax:
    LCASE(str)
    OR
    LOWER (Str)
  - ❐ **MID( )** : This function extracts a substring from a string and returns a string with given length and position.
    Syntax:
    MID(str, pos, len)
  - ❐ **SUBSTRING( )/SUBSTR( )** : These functions are same as MID( ) function.
    Syntax:
    SUBSTRTING(str, pos, len)
  - ❐ **LENGTH( )** : This function is used to return the length of the specified string. It returns the length in bytes. This function also includes all the blanks spaces which are include in string.
    Syntax:
    LENGTH(str)
  - ❐ **LEFT( )** : This function is used to return a specified number of characters from the left of the string. The number of characters returned is determined by the second argument.
    Syntax :
    LEFT(str, len)

- **RIGHT( )** : This function is just opposite of LEFT( ) function. It is used to return a specified number of characters from the right of the string. The number of characters returned is determined by the second argument.
  Syntax:
  RIGHT(str, len)
- **INSTR( )** : This function takes two arguments as str (string) and sub_str (sub string) and returns the position of the first occurrence of a specified sub_str from a given str.
  Syntax:
  INSTR(str, sub_str)
- **LTRIM( )** : This function takes a string argument and returns a new string with all the leading space characters removed. Spaces in the middle or trailing spaces are not removed.
  Syntax:
  LTRIM(str)
- **RTRIM( )** : This function takes a string argument and returns a new string with all the trailing space characters removed. Spaces in the middle or leading space are not removed.
  Syntax:
  RTRIM(str)
- **TRIM( )** : This functions enables you to remove leading and trailing white space from string.
  Syntax :
  TRIM(str)

➢ **Date Functions**

- The date functions are used to perform some operations on date that is stored in the database. Some common date functions are as follows:
  - **NOW( )** : This function returns the current date and time in the configured time zone as a string, or a number in the 'YYYY-MM-DD HH : MM : SS' or 'YYYYMMDDHHMMSS' format.
    Syntax:
    NOW( )
  - **DATE( )** : This function extracts the date value from a date.
    Syntax:
    DATE( )
  - **MONTH( )** : This function returns the month for date, in the range 1 to 12 for January to December. If it returns 0 then month part of the given date contains NULL.
    Syntax:
    MONTH(date)
  - **MONTHNAME( )** : This function returns the full name of the month for given date.
    Syntax:
    MONTHNAME(date)
  - **YEAR( )** : This function returns the year of the given date. It returns a year value in the range 1000 to 9999. If the date is zero, it returns 0.
    Syntax :
    YEAR(date)
  - **DAY( )** : This function returns the day of the month of a given date. If the date argument is zero, it returns 0. In case, the date in NULL, this function returns NULL.
    Syntax :
    DAY(date)

Aggregate Functions

➢ An aggregate function performs a calculation on one or more values and returns a single value.
➢ We often use aggregate functions with the GROUP By and HAVING clauses of the SELECT statement.
➢ Except for count(*), aggregate functions totally ignore NULL values and consider all values present in a column.
Some aggregate functions are as follows:

- **MAX()** : This function returns the maximum value in selected columns. MAX() function ignores NULL values and considers all values in the calculation.
  Syntax:
  SELECT MAX(Column_Name) FROM Table_Name ;
- **MIN():** This function returns the minimum value in the selected columns. MIN() function ignores NULL values
  Syntax:
  SELECT MIN(Column_Name) FROM Table_Name;
- **AVG():** This function calculates the average of specified column(s). It ignores NULL values.
  Syntax:
  SELECT AVG(Column_Name) FROM Table_Name;

- **SUM()** : This function calculates the sum of all values in the specified columns. It accepts only the expression that evaluates to numeric values also.
  Syntax :
  SELECT SUM(Column_Name) FROM Table_Name;
- **COUNT()** : This function returns the number of items found in a set.
  COUNT(*) function returns a number of rows in a specified table or view that includes the number of duplicates and NULL values.
  Syntax:
  SELECT COUNT(*) FROM Table_Name;

➢ **GROUP BY Clause**

- GROUP BY clause is used to group rows returned by SELECT statement into a specified rows or columns.

Syntax:

SELECT column 1, column 2, ..., Aggregate_function (exp)
FROM Table_Name
WHERE condition
GROUP BY Column_Name;

➢ **ORDER BY Clause**

- ORDER BY clause is used to sort a result set returned by a SELECT statement.
- To sort a result set in ascending order, use ASC keyword and in descending order, use DESC keyword.
- The ORDER BY clause sorts the result set in ascending order by default.

Syntax:

SELECT column 1, column 2, ...
FROM Table_Name
ORDER BY Column_Name <ASC/DESC>;

➢ **HAVING Clause**

- The HAVING clause is often used with the GROUP BY clause in the SELECT statement to filter group of rows based on a specified condition.

Syntax:

SELECT column 1, column 2, ..., Aggregate_function (Exp)
FROM Table_Name
GROUP BY Column_Name
HAVING condition;

CHAPTER 4 : Introduction to Computer Networks

Computer Networks

➢ A computer network is an interconnected collection of computers that allows sharing of resources and information. Computers may connect to each other by either wired or wireless media.

➢ **Types of Network**

A computer network can be categorized by their size. Types of network are as follows :

(i) Local Area Network (LAN) : It is a network where two or more computers are connected within a range of 1 km. LAN exists within a campus. It is owned by a single organization. Many expensive printers are shared through LAN. There is a limit on the number of computers that can be attached to a single LAN.

(ii) Metropolitan Area Network (MAN) : It covers up to 50 km area. MAN is larger than a LAN but smaller than WAN. MANs are usually characterized by high speed connections. They are usually operated by a single entity such as a government body or larger corporation. It expands throughout a city such as cable TV network.

(iii) Wide Area Network (WAN) : It spans a large geographical area often a country or a continent. Internet is the largest WAN. Wide Area Networks are widely used in the field of business, government, education, etc.

➢ **Network Devices**

- **Hub**: It connects multiple computer networking devices together. A hub also acts as a repeater in that it amplifies signals that deteriorate after travelling long distances over connecting cables.
- **Switch**: Switches generally have a more intelligent role than hubs. It maintains limited routing information about nodes in the internal network, and it allows connections to systems like hubs or routers.
- **Router**: Routers help transmit packets to their destinations by charting a path through the sea of interconnected networking devices using different network topologies. Routers are also used to divide internal network into two or more sub networks.

- **Bridge**: Bridges are used to connect two or more hosts or network segments together. The basic role of bridge network architecture is storing and forwarding frames between the different segments that the bridge connects.
- **Gateway**: It is a network device that is used to connect two or more dissimilar networks. A gateway usually is a computer with multiple Mics connected to different networks.
- **Modem**: Modems (MOdulators-DEModulators) are used to transmit digital signals over analog telephone lines. Digital signals are converted by the modem into analog signals of different frequencies and transmitted to a modem at the receiving location.
- **Repeater**: It is an electronic device that amplifies the signal it receives. Repeaters work on the physical layer.

➢ **Network Topology**

Topology refers to the way in which the workstations attached to the network are interconnected.

Some common network topologies are as follows:

- **Bus Topology**: It uses a common single cable to connect all the workstations. Each computer reforms its task of sending messages without the help of the central server. However, only one workstation can transmit a message at a particular time in the bus topology.
- **Star Topology**: It is based on a central connection which acts as a hub. A star topology is common in home networks where all the computers connect to the single central computer using a hub.
- **Tree Topology**: It combines the characteristics of the linear bus and star topologies. It consists of groups of star configured workstation connected to a bus backbone cable.
- **Mesh Topology**: In this topology, each device is connected to every other device on the network through a dedicated point-to-point link. When we say dedicated, it means that the link only carries data for the two connected devices only.

Internet

➢ The Internet is world wide system of computer networks i.e., network of networks. Through Internet, computers become able to exchange information with each other and find diverse perspective on issues from a global audience. All computer on the Internet, communicate with one another using TCP/IP, which is a basic protocol of the Internet.

➢ **URL**

- URL stands for Uniform Resource Locator. It is a unique identifier used to locate a resource on the Internet. It is also referred to as a web addresses.
- URL protocols include HTTP (Hypertext Transfer Protocol) and HTTPs (HTTP secure) for web resources, SMTP for email, FTP for files on a file transfer protocol server and telnet for session to access remote computers.

➢ **World Wide Web (WWW)**

- The world wide web is a way of exchanging information, between computers on the Internet, typing them together into a vast collection of interactive multimedia resources.
- The development of the world wide web was begun in 1989 by Tim Berners-Lee and his colleagues at CERN, an international scientific organization based in Geneva, Switzerland.
- World wide web had several differences from other hypertext systems available at that time. The web required only unidirectional links rather than bidirectional ones, making it possible for someone to link to another resource without action by the owner of that resource.

➢ **Web**

- Web is the common name for the World Wide Web, a subset of the Internet consisting of the pages that can be accessed by a web browser.
- Many people assume that the web is the same as the Internet and use these terms interchangeably. However, the term Internet refers to the global network of servers that makes the information sharing, over the web possible.

➢ **E-mail**

- E-mail stands for Electronic Mail. It is a paperless method of sending messages, notes, pictures and even audio files from one place to another using the Internet as a medium.
- E-mail address is an individual name which is used to send and receive e-mail on the Internet. It is used to specify the source or destination of an e-mail message.

The format of an e-mail address is user@domain.

Some components of e-mail messages are :

- **To** field is where the e-mail address of the person receiving the e-mail is placed.
- **From** field is where your e-mail address put.
- **Subject** field indicates the purpose of e-mail.
- **Cc** stands for Carbon Copy. It specifies recipients who are not direct addresses. This filed is optional.
- **Bcc** stands for Blind Carbon Copy. It is similar to Cc, except the recipients are secret. This field is optional.
- **Message Body** is the area where you type your main message.

➢ **Chat**

- Chat refers to the process of communicating, interacting and/or exchanging message over the Internet. It involves two or more individuals that communicate through a chat enabled service or software.
- In addition, there are many browser based services that do not require downloaded chat program.

There are two basic modes for chatting on the Internet as follows:

1. Text-based chat: Enables communication through sending and receiving text messages.
2. Multimedia chat: Enables communication through audio and video transmission.

- A chat room is the hub of Internet chatting. Chat rooms are actually chat servers that allow several users to login to them simultaneously. After joining a room, you can read the message of other users and send your own messages to them or to anyone else.

➢ **VoIP**

- VoIP stands for voice over Internet protocol. It is a technology that allows you to make voice calls using a broadband internet connection instead of a regular phone line.
- If you are calling a regular phone number, the signal is converted to a regular telephone signal before it calls directly from a computer, a special VoIP phone or a traditional phone connected to a special adapter.
- A voice over IP solution provides significant cost savings over a traditional phone system. Users can take advantage of free calls and low rates for international calls and long distance.

➢ **Website**

- A site or website is a central location of web pages that are related and accessed by visiting the home page of the website using a browser.
- Website come in a nearly endless variety, including educational sites, news sites, forums, social media sites, e-commerce sites and so on. The pages within a website are usually a mix of text and other media.
- Basically, a website is a collection of publicly accessible, interlinked web pages that share a single domain name. Websites can be created and maintained by an individual, group, business or organization to serve a variety of purposes.
- The first website was built at CERN by Tim Berners-Lee and launched on August 6, 1991.

➢ **Web page**

- A web page is a document for the world wide web that is identified by a unique uniform resource locator (URL). These pages are written in HTML, that is viewed in an Internet browser. A webpage may contain text, graphics and hyperlinks to other web pages and files.
- A webpage is often used to show private information to viewers, including pictures or videos to help illustrate important topics. A web page may also be used as a method to sell products or services to viewers.
- There are two types of web pages as static web page and dynamic web page.

➢ **Web Server**

- A web server is a computer that runs websites. It is a computer program that distributes web pages as they are requested. The basic objective of the web server is to store, process and deliver web pages to the users.
- The main job of a web server is to display the website content. If a web server is not exposed to the public and is used internally, then it is called Internet server.

➢ **Web Hosting**

- A web hosting is a type of Internet hosting service that allows individuals and organizations to make their website accessible via world wide web. Web hosts are companies that provide space on a server. Owned and leased for use by clients as well as providing Internet connectivity, typically in a data center.

➢ **Web Browser**

- A web browser or simply browser is special software that enables the users to read/view webpage and jump from one webpage to another. It displays a webpage and interprets its HTML codes. It is the software that is needed to find, retrieve, view and send information over the Internet.
- Some commonly used browsers are google chrome, Mozilla Firefox, etc.

➢ **Add-ons**

- Add-ons are tools which integrate into your browser. They are similar to regular apps or programs, but only run when the browser runs. Add-ons can allow the viewing of certain types of web content, such as Adobe Flash player for youtube videos, etc.
- Add-os can work within the framework of the browser provided or they can provide separate functions, such adding a status bar.

➢ **Plug-ins**

- Plug-ins are software additions that allow for the customization of computer programs, apps and web browser as well as the customization of the content offered by websites. While plug-ins continue to be used by add-ons to customize programs and apps, their use in web browser has decreased somewhat, in favor of using browser extensions instead.

➢ **Cookies**

- Cookies are messages that web servers pass to your web browser when you visit Internet sites. Your browser stores each message in a small fill, called cookies txt. When you request another page from the server, your browser sends the cookies back to the server. These files typically contain information about your visit to the web page as well as any information you have volunteered.

CHAPTER 5 : SOCIETAL IMPACTS

➢ **Cyber Safety**

- Cyber safety is the act all about the responsible and safe use of Internet services by dealing with the risk which is associated using the Internet. This behavior helps us to protect our personal information and minimize the danger online.

➢ **Digital Footprint**

- Whatever a person be on internet creates his usage or we can say left a shadow behind of that activity and all these activities shadow creates your identity, this identity is called digital footprint. Digital footprint is nothing but the record of what a person do online.
- Digital footprint includes e-mail you sent, information you shared, websites you visited and the activities you took part online.

Digital footprint is of two types:

1. **Active Digital Footprint**: When a user knowingly share the personal data in order to share information about the user by means of social networking digital platform. e.g. when user makes a comment or post something on social media.
2. **Passive Digital Footprint**: When the personal data of the user in collected without letting him know or collection of personal data of user without the permission of him is known as passive digital footprint. e.g. when user visits any website traces his physical location using user's device IP address.

➢ **Net and Communication Etiquettes (Netiquettes)**

- Netiquette is a way to communicate over Internet. In real world, we use a manner to talk so that the exact meaning could successfully convey to the listener. On Internet, this manner is known as Netiquettes which help the user to get exact idea of what is said.
- Netiquettes makes the communication process successful because without it sender's message can be misinterpreted by the receiver though he will not be able to see the facial expression of the sender.
- Netiquettes makes the communication more effective by adding human emotion to it. By using netiquettes, sender can express what he was feeling while writing the post or message.
- Netiquettes help the user in establishing good relation with the other users because when use netiquettes he can express what he feels or what he wants to say.

➢ **Data Protection**

- It is the process of safeguarding important information from corruption, compromise or loss. In short, you should be able to decide whether or not you want to share some information, who has access to it, for how long, for what reason and be able to modify some of this information and more.
- A large part of a data protection strategy is ensuring that data can be restored quickly after any corruption or loss. Protecting data from compromise and ensuring data privacy are other key components of data protection. There are two key areas of data management used in data protection as:
  - **(i) Data life cycle management** is the process of automating the movement of critical data to online and offline storage.
  - **(ii) Information life cycle management** is a comprehensive strategy for valuing, cataloguing and protecting information assets from application and user errors, malware and virus attacks, machine failure or facility outage and disruptions.

Ethical-Issues

➢ **Intellectual Property**

- When someone owns a house or a motorcycle, we say that the person owns that property. Similarly, if someone comes out with a new idea, this original idea is that person's intellectual property.
- Intellectual property refers to the inventions, literary and artistic expressions, designs and symbols, names and logos. The ownership of such concepts lies with the creator or the holder of the intellectual property.

Intellectual property is legally protected through copyright patents, trademarks etc.

(i) Copyright: It grants legal rights to creators for their original works like writing, photograph, audio recordings, video, sculptures, architectural works, computer software, and other creative works like literary and artistic work.

(ii) Patent: It is usually granted for inventions. Unlike copyright, the inventor needs to file for patenting the invention. When a patent is granted, the owner gets an exclusive right to prevent others from using selling or distributing the protected invention.

(iii) Trademark: It includes any visual symbol, word, name, design, slogan, label, etc., that distinguishes the brand or commercial enterprise, from other brands or commercial enterprise.

- **Intellectual Property Rights (IPR)**
  - Intellectual Property Rights are the exclusive rights given to the person over his/her creation for specific time period. These rights allow the patents or owner to buy, sell and exchange their licensed goods to different people or organizations. Intellectual property rights are largely covered by laws governing to patents. Copyrights, industrial design rights, trademarks, plant variety rights, trade dress, geographical indications, circuit design rights and supplementary protection certificates for pharmaceutical products and database rights, etc.
- **Violation of IPR**
  1. **Plagiarism**: With the availability of Internet, we can instantly copy or share text, pictures and videos. Presenting someone else's idea or works as one's own idea or work is called plagiarism. If we copy some contents from Internet, but do not mention the source or the original creator, then it is considered as an act of plagiarism.
  2. **Copyright Infringement**: Copyright infringement is when we use other person's work without obtaining their permission to use or we have not paid for it, if it is being sold. Suppose we download an image from the Internet and use it in our project. But if the owner of the copyright of the image does not permit its free usage, then using such image even after giving reference of the image in our project is a violation of copyright.
  3. **Trademark Infringement**: Trademark infringement means unauthorised use of other's trademark on products and services. An owner of a trademark may commence legal proceedings against someone who infringes its registered trademark.
- **Software License**
  - It is a document that provides legally binding guidelines for the use and distribution of software. Software licenses typically provide end users with the right to one or more copies of the software without violating copyrights.

  Types of Software License:
  (i) Proprietary license
  (ii) GNU General Public License (GPL)
  (iii) End User License Agreement (EULA)
  (iv) Creative Commons (CC) license
- **Free and Open Source Software (FOSS)**
  - FOSS has a large community of users and developer who are contributing continuously towards adding new features or improving the existing features.
  - The term "free" indicates that the software does not have constraints on copyrights. The "Term" "open source" refers software development from expert developers collaborating worldwide without any need for reverse engineering. It is also referred as Free/Libre open source software (FLOSS) or free open source software (FOSS).
- **Cyber Crime**
  - Criminal activities or offences carried out in a digital environment can be considered as a cyber crime. In such crimes, either the computer itself is the target or the computer is used as a tool to commit a crime.
  - Cyber crimes are carried out against either an individual or a group or an organization or even against a country, with the intent to directly or indirectly cause physical harm, financial loss or mental harassment. A cyber criminal attacks a computer or a network to reach other computers in order to disable or damage data or services.

  The nature of criminal activities are alarmingly increasing day by day, with frequent reports of hacking, ransomware attacks, denial of services, phishing, e-mail fraud, banking fraud and identity theft.

  1. **Hacking**

     Hacking is the act of unauthorised access to a computer, computer network or any digital system. Hackers usually have technical expertise of the hardware and software.

     They look for bugs to exploit and break into the system.
  2. **Phishing and Fraud e-mails**

     Phishing is an unlawful activity where fake websites or e-mails that look original or authentic are presented to the user to fraudulently collect sensitive and personal details, particularly usernames, passwords, banking and credit card details.
  3. **Ransomware**

     This is another kind of cyber crime where the attacker gains access to the computer and blocks the user from accessing, usually by encrypting the data. The attacker blackmails the victim to pay for getting access to the data or sometimes threaten to publish personal and sensitive information or photographs unless a ransom is paid.
- **Cyber Bullying**
  - Cyber bullying or bullying that takes place over digital devices like cell phones, computers and tablets. Cyber bullying can occur through SMS, text and apps or online in social media, forums or gaming where people can view, participate or share content.

- Cyber bullying includes sending, posting or sharing negative, harmful, false or mean content about someone else. It can include sharing personal or private information about someone else causing embarrassment or humiliation. Some cyber bullying crosses the line into unlawful or criminal behavior.

➢ **Cyber Law**

- It is any law that applies to the Internet and Internet related technologies. Cyber law is one of the newest areas of the legal system. This is because Internet technology develops at such a rapid pace.
- Cyber law provides legal protections to people using the Internet. This includes both businesses and everyday citizens. Understanding cyber law is of the utmost importance to anyone who uses the Internet. Cyber law has also been referred to as the "law of the Internet".

➢ **India Information Technology Act (IT Act)**

- With the growth of Internet, many cases of cyber crimes, frauds, cyber attacks and cyber bullying are reported. The nature of fraudulent activities and crimes keeps changing. To deal with such menaces, many countries have come up with legal measures for protection of sensitive personal data and to safeguard the rights of Internet users.
- The Parliament of India passed its first Cyber law the Information Technology (IT) Act, 2000, on the 17th October 2000, which provides the legal infrastructure for e-commerce in India. The purpose of the IT Act, 2000, as mentioned in the language of the Act is :

An Act to provide legal recognition for transaction carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as " electronic commerce", which involves the use of alternative to paper based methods of communication and storage of information, to facilitate electronic filling of document with the Government agencies and further to amend the Indian Penal Code, the Indian Evidence Act,1872, the Banker's Book Evidence Act, 1891 and The Reserve Bank of India Act, 1934 and for matters connected therewith or incidental thereto.

➢ **E-waste Management**

- In most part of the world, underground water is not drinkable directly. Long ago, people simply used to draw up water from wells and drink it. But now, you have to use some sort of filter to purify the water and make it drinkable. Why? It is just one of the many problems and hazards of e-waste. The electronic devices, dead cells and batteries you throw away with other garbage contains lead that easily mixes with underground water, making it unfit for direct consumption. That is just the tip of the iceberg – the problems of e-waste disposal.
- This word has caught up in the recent past only when someone studying the subject noted that our environment will be 3x more congested with e-waste by 2017. E-waste is growing in huge volumes. The reason why e-waste is increasing is that technology is growing fast and in an attempt to get better devices, we casually get rid of old electronics – the best examples being that of smart-phones.

➢ **Treating e-Waste**

- As of now, there are no proper methods being implemented even in the first world to eliminate the problem of e-waste. The two methods that found interesting for proper treatment of e-waste are recycling and refurbishing.
- For recycling, there may be products that cannot be recycled completely. PVC layers, for example, stay as such for ages and cannot be recycled. It would be better if the manufacturers use recyclable material so that the e-waste is converted into something that can be used again without harming the planet and its inhabitants. Thus, one of the major factors in treating e-waste is to compel manufacturers to use green elements.

❐❐

Sample Question Paper-1

(Issued by Board dated 16th Sep. 2022)

Informatics Practices [065]

Class- XII

Session-2022-23

SOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. Television cable network is an example of:
(A) LAN **(B)** WAN **(C)** MAN **(D)** Internet **[1]**

2. Which of the following is not a type of cyber crime?
(A) Data theft **(B)** Installing antivirus for protection
(C) Forgery **(D)** Cyber bullying **[1]**

3. What is an example of e-waste?
(A) A ripened mango **(B)** Unused old shoes **(C)** Unused old computers **(D)** Empty cola cans **[1]**

4. Which type of values will not be considered by SQL while executing the following statement?
SELECT COUNT(column name) FROM inventory;
(A) Numeric value **(B)** text value **(C)** Null value **(D)** Date value **[1]**

5. If column "Fees" contains the data set (5000,8000,7500,5000,8000), what will be the output after the execution of the given query?
SELECT SUM (DISTINCT Fees) FROM student;
(A) 20500 **(B)** 10000 **(C)** 20000 **(D)** 33500 **[1]**

6. 'O' in FOSS stands for:
(A) Outsource **(B)** Open **(C)** Original **(D)** Outstanding **[1]**

7. Which SQL statement do we use to find out the total number of records present in the table ORDERS?
(A) SELECT * FROM ORDERS; **(B)** SELECT COUNT (*) FROM ORDERS;
(B) SELECT FIND (*) FROM ORDERS; **(D)** SELECT SUM () FROM ORDERS; **[1]**

8. Which one of the following is not an aggregate function?
(A) ROUND() **(B)** SUM() **(C)** COUNT() **(D)** AVG() **[1]**

9. Which one of the following functions is used to find the largest value from the given data in MySQL?
(A) MAX( ) **(B)** MAXIMUM( ) **(C)** BIG( ) **(D)** LARGE( ) **[1]**

10. To display last five rows of a series object 'S', you may write:
(A) S.Head() **(B)** S.Tail(5) **(C)** S.Head(5) **(D)** S.tail() **[1]**

11. Which of the following statement will import pandas library?
(A) Import pandas as pd **(B)** import Pandas as py **(C)** import pandas as pd **(D)** import panda as pd **[1]**

12. Which of the following can be used to specify the data while creating a DataFrame?
(A) Series **(B)** List of Dictionaries **(C)** Structured ndarray **(D)** All of these **[1]**

13. Which amongst the following is not an example of a browser?
(A) Chrome **(B)** Firefox **(C)** Avast **(D)** Edge **[1]**

14. In SQL, which function is used to display current date and time?
(A) Date () **(B)** Time () **(C)** Current () **(D)** Now () **[1]**

15. Legal term to describe the rights of a creator of original creative or artistic work is:
(A) Copyright **(B)** Copyleft **(C)** GPL **(D)** FOSS **[1]**

16. _____ is the trail of data we leave behind when we visit any website (or use any online application or portal) to fill-in data or perform any transaction.
(A) Offline phishing **(B)** Offline footprint **(C)** Digital footprint **(D)** Digital phishing **[1]**

Assertion & Reason

Directions: 17 and 18 are ASSERTION AND REASONING based questions. Mark the correct choice as
(A) Both (A) and (R) are true and (R) is the correct explanation (A)
(B) Both (A) and (R) are true and R is not the correct explanation (A)
(C) (A) is True but (R) is False
(D) (A) is false but (R) is True

17. **Assertion (A):** Internet cookies are text files that contain small pieces of data, like a username, password and user's preferences while surfing the internet.
Reasoning (R): To make browsing the Internet faster & easier, its required to store certain information on the server's computer. **[1]**

18. **Assertion (A):** DataFrame has both a row and column index.
Reasoning (R): A DataFrame is a two-dimensional labelled data structure like a table of MySQL. **[1]**

Section - B

19. Explain the terms Web page and Home Page.

OR

Mention any four networking goals. **[2]**

20. Rashmi, a database administrator needs to display house wise total number of records of '**Red**' and '**Yellow**' house. She is encountering an error while executing the following query:
SELECT HOUSE, COUNT (*) FROM STUDENT GROUP BY HOUSE WHERE HOUSE='RED' OR HOUSE= 'YELLOW';
Help her in identifying the reason of the error and write the correct query by suggesting the possible correction (s). **[2]**

21. What is the purpose of Order By clause in SQL? Explain with the help of suitable example. **[2]**

22. Write a program to create a series object using a dictionary that stores the number of students in each house of class 12D of your school.
Note: Assume four house names are Beas, Chenab, Ravi and Satluj having 18, 2, 20, 18 students respectively and pandas library has been imported as pd. **[2]**

23. List any four benefits of e-waste management.

OR

Mention any four net etiquettes. **[2]**

24. What will be the output of the following code:

```
>>>import pandas as pd
>>>A=pd.Series(data=[35,45,55,40])
>>>print(A>45)
```

[2]

25. Carefully observe the following code:

```
import pandas as pd
Year1={'Q1':5000,'Q2':8000,'Q3':12000,'Q4': 18000}
Year2={'A' :13000,'B':14000,'C':12000}
totSales={1:Year1,2:Year2} df=pd.DataFrame(totSales)
print(df)
```

Answer the following:

(i) List the index of the DataFrame df

(ii) List the column names of DataFrame df. **[2]**

Section - C

26. Write outputs for SQL queries (i) to (iii) which are based on the given table PURCHASE:

TABLE: PURCHASE

CNO	CNAME	CITY	QUANTITY	DOP
C01	GURPREET	NEW DELHI	150	2022-06-11
C02	MALIKA	HYDERABAD	10	2022-02-19
C03	NADAR	DALHOUSIE	100	2021-12-04
C04	SAHIB	CHANDIGARH	50	2021-10-10
C05	MEHAK	CHANDIGARH	15	2021-10-20

(i) SELECT LENGTH(CNAME) FROM PURCHASE WHERE QUANTITY>100;

(ii) SELECT CNAME FROM PURCHASE WHERE MONTH(DOP)=3;

(iii) SELECT MOD (QUANTITY, DAY(DOP)) FROM PURCHASE WHERE CITY= 'CHANDIGARH'; **[3]**

27. Write a Python code to create a DataFrame with appropriate column headings from the list given below:
[[101,'Gurman',98],[102,'Rajveer',95],[103,'Samar' ,96],[104,'Yuvraj',88]] **[3]**

28. Consider the given DataFrame 'Stock':

	Name	Price
0.	Nancy Drew	150
1.	Hardy boys	180
2.	Diary of a wimpy kid	225
3.	Harry Potter	500

Write suitable Python statements for the following:

(i) Add a column called Special_Price with the following data: [135,150,200,440].

(ii) Add a new book named 'The Secret' having price 800.

(iii) Remove the column Special_Price. **[3]**

29. Nadar has recently shifted to a new city and school. She does not know many people in her new city and school. But all of a sudden, someone is posting negative, demeaning comments on her social networking profile, etc. She is also getting repeated mails from unknown people. Every time she goes online, she finds someone chasing her online.

(i) What is this happening to Nadar?

(ii) What immediate action should she take to handle it?

(iii) Is there any law in India to handle such issues? Discuss briefly. **[3]**

OR

What do you understand by plagiarism? Why is it a punishable offence? Mention any two ways to avoid plagiarism.

30. Based on table STUDENT given here, write suitable SQL queries for the following:

Roll No	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

Discuss the significance of Group by clause in detail with the help of suitable example. **[3]**

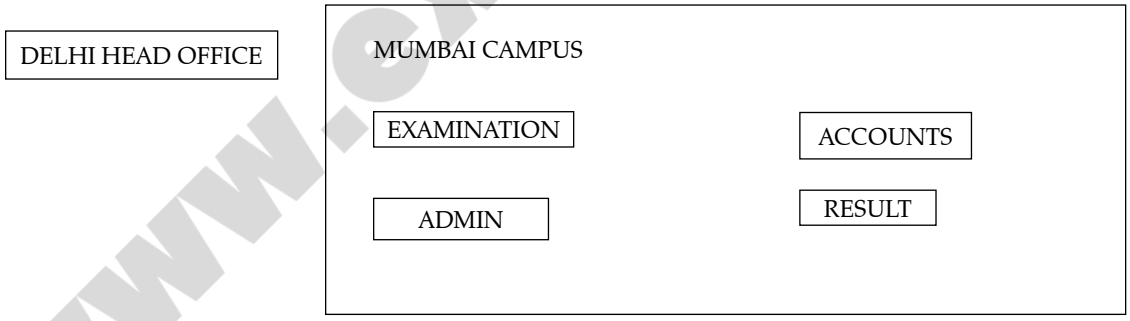
Section - D

31. Write suitable SQL query for the following:
(i) Display 7 characters extracted from 7^{th} left character onwards from the string 'INDIA SHINING'.
(ii) Display the position of occurrence of string 'COME' in the string 'WELCOME WORLD'.
(iii) Round off the value 23.78 to one decimal place.
(iv) Display the remainder of 100 divided by 9.
(v) Remove all the expected leading and trailing spaces from a column userid of the table '**USERS**'.

OR

Explain the following SQL functions using suitable examples.
(i) UCASE()
(ii) TRIM()
(iii) MID()
(iv) DAYNAME()
(v) POWER() **[5]**

32. Prime Computer services Ltd. is an international educational organization. It is planning to set up its India campus at Mumbai with its head office in Delhi. The Mumbai office campus has four main buildings-ADMIN, ACCOUNTS, EXAMINATION and RESULT.
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 ACCOUNTS	55 m
ADMIN TO EXAMINATION	90 m
ADMIN TO RESULT	50 m
ACCOUNTS TO EXAMINATION	55 m
ACCOUNTS TO RESULT	50 m
EXAMINATION TO RESULT	45 m
DELHI Head Office to MUMBAI campus	2150 m

Number of computers installed at various buildings are as follows:

ADMIN	110
ACCOUNTS	75
EXAMINATION	40
RESULT	12
DELHI HEAD OFFICE	20

(i) Suggest the most appropriate location of the server inside the MUMBAI campus (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 MUMBAI campus for a wired connectivity.

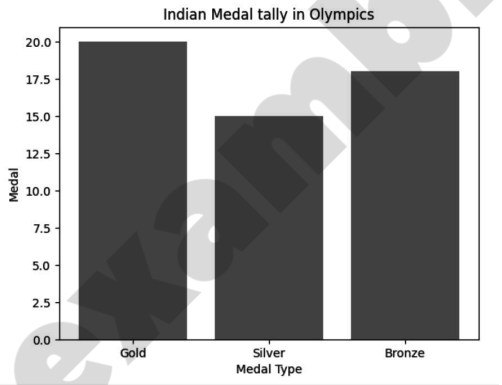
(iii) Which networking device will you suggest to be procured by the company to interconnect all the computers of various buildings of MUMBAI campus?

(iv) Company is planning to get its website designed which will allow students to see their results after registering 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 Mumbai campus and Delhi headoffice?

(a) Cable TV
(b) Email
(c) Video conferencing
(d) Text chat **[5]**

33. Write Python code to plot a bar chart for India's medal tally as shown below:



Also give suitable python statement to save this chart.

OR

Write a python program to plot a line chart based on the given data to depict the changing weekly average temperature in Delhi for four weeks.
Week=[1,2,3,4]
Avg_week_temp=[40,42,38,44] **[5]**

Section - E

Case based Subjective Questions

34. Shreya, a database administrator has designed a database for a clothing shop. Help her by writing answers of the following questions based on the given table:

TABLE: CLOTH

CCODE	CNAME	SIZE	COLOR	PRICE	DOP
C001	JEANS	XL	BLUE	990	2022-01-21
C002	TSHIRT	M	RED	599	2021-12-12
C003	TROUSER	M	GREY	399	2021-11-10
C004	SAREE	FREE	GREEN	1299	2019-11-12
C005	KURTI	L	WHITE	399	2021-12-07

(i) Write a query to display cloth names in lowercase.
(ii) Write a query to display the lowest price of thecloths.
(iii) Write a query to count total number of cloths purchased of medium size. **1+1+2**

OR (Option for part iii only)

Write a query to count year wise total number of cloths purchased.

35. Mr. Som, a data analyst has designed the DataFrame **df** that contains data about Computer Olympiad with 'CO1' ','CO2','CO3','CO4','CO5'as indexes shown below. Answer the following questions:

	School	Tot_students	Topper	First_Runnerup
CO1	PPS	40	32	8
CO2	JPS	30	18	12
CO3	GPS	20	18	2
CO4	MPS	18	10	8
CO5	BPS	28	20	8

(A) Predict the output of the following python statement:
(i) df.shape
(ii) df[2:4]
(B) Write Python statement to display the data of Topper column of indexes CO2 to CO4. **1+1+2**

Write Python statement to compute and display the difference of data of Tot_students column and First_Runnerup column of the above given DataFrame.

■■■

SOLUTIONS

Sample Question Paper-1

Informatics Practices

1. **Option (C) is correct.**
Explanation: Television cable network is an example of MAN. A metropolitan area network (MAN) is a computer network that connects computers within a metropolitan area, which could be a single large city, multiple cities and towns, or any given large area with multiple buildings. **[1]**

2. **Option (B) is correct.**
Explanation: Cybercrime is a crime that involves a computer and a network. The computer may have been used in the commission of a crime, or it may be the target. Installing antivirus for protection is not a cybercrime. **[1]**

3. **Option (C) is correct.**
Explanation: E-waste is a popular, informal name for electronic products nearing the end of their "useful life." Computers, televisions, VCRs, stereos, copiers, and fax machines are common electronic products. **[1]**

4. **Option (C) is correct.**
Explanation: The COUNT() function returns the number of records returned by a select query. Note: NULL values are not counted.
Syntax
COUNT(expression) . **[1]**

5. **Option (A) is correct.**
Explanation: sum() function is used to return the total summed value of an expression. DISTINCT statement is used to return only distinct (different) values. . **[1]**

6. **Option (B) is correct.**
Explanation: Free and open-source software (FOSS) allows users and programmers to edit, modify or reuse the software's source code. This gives developers the opportunity to improve program functionality by modifying it. . **[1]**

7. **Option (B) is correct.**
Explanation: The COUNT() function returns the number of records returned by a select query. Note: NULL values are not counted . **[1]**

8. **Option (A) is correct.**
Explanation: An aggregate function in SQL performs a calculation on multiple values and returns a single value. SQL provides many aggregate functions that include avg, count, sum, min, max, etc. ROUND() is mathematical function. **[1]**

9. **Option (A) is correct.**
Explanation: MAX function is used to return the maximum value of an expression in a SELECT statement.
Syntax
SELECT MAX(aggregate_expression)
FROM tables
[WHERE conditions]; . **[1]**

10. **Option (D) is correct.**
Explanation: tail() function in Python displays the last five rows of the dataframe by default. It takes in a single parameter: the number of rows. We can use this parameter to display the number of rows of our choice. **[1]**

11. **Option (C) is correct.**
Explanation: Pandas is a popular Python-based data analysis toolkit which can be imported using import pandas as pd. . **[1]**

12. **Option (D) is correct.**
Explanation: Pandas DataFrame is a 2-dimensional labeled data structure like any table with rows and columns. Series, List of Dictionaries and Structured ndarray can be used to specify the data while creating a DataFrame. **[1]**

13. **Option (C) is correct.**
Explanation: A web browser is a type of software that allows you to find and view websites on the Internet. Chrome, Firefox and Edge are examples of Web browser. Avast is an example of antivirus. **[1]**

14. **Option (D) is correct.**
Explanation: The NOW() function returns the current date and time. Note: The date and time is returned as "YYYY-MM-DD HH-MM-SS" (string) or as YYYYMMDDHHMMSS. uuuuuu (numeric). **[1]**

15. **Option (A) is correct.**
Explanation: Copyright (or author's right) is a legal term used to describe the rights that creators have over their literary and artistic works. Works covered by copyright range from books, music, paintings, sculpture, and films, to computer programs, databases, advertisements, maps, and technical drawings. . **[1]**

16. **Option (C) is correct.**
Explanation: Digital footprint is the trail of data we leave behind when we visit any website to fill-in data or perform any transaction. A digital footprint, sometimes called a digital dossier. Digital footprints are sometimes broken down into active and passive data traces. . **[1]**

17. **Option (C) is correct.**
Explanation: Managing your open tabs more efficiently will also help you browse faster. . **[1]**

18. **Option (A) is correct.**
Explanation: Indexing in Pandas means selecting rows and columns of data from a Dataframe. It can be selecting all the rows and the particular number of columns, a particular number of rows, and all the columns or a particular number of rows and columns each. . **[1]**

19. **Web Page:** A Web Page is a part of a website and is commonly written in HTML.It can be accessed through a webbrowser. . **[2]**
Home Page: It is the first web page you see when you visit a website. . **[1]**
[1 mark for correct explanation of each term]

OR

Four networking goals are:
(i) Resource sharing
(ii) Reliability
(iii) Costeffective
(iv) Fast data sharing *[½ mark for each goal]*

20. The problem with the given SQL query is that WHERE clause should not be used with Group By clause.
To correct the error, HAVING clause should be used instead of WHERE. Corrected Query:
SELECT HOUSE, COUNT(*) FROM STUDENT GROUP BY HOUSE HAVING HOUSE= 'RED' OR HOUSE='YELLOW'; **[2]**
[1 Mark for error identification]
[1 Mark for writing correct query}

21. Order By clause:
The ORDER BY command is used to sort the result set in ascending or descending order.
The following SQL statement displays all the customer's names in alphabetical order:
SELECT Cname FROM Customers ORDER BY Cname; **[2]**
[1 mark for correct purpose] [1 mark for correct example]

22. St={'Beas' :18, 'Chenab' :20 , ' Ravi' :20, ' Satluj' :18}
S1=pd.Series(St) **[2]**
[1 mark for each correct python statement]

23. The e-waste management-
(i) Saves the environment and natural resources
(ii) Allows for recovery of precious metals
(iii) Protects public health and water quality
(iv) Saves landfills pace **[2]**
[½ mark for each benefit]

OR

(i) No copyright violation
(ii) Share the expertise with others on the internet
(iii) Avoid cyber bullying
(iv) Respect other's privacy and diversity
[½ mark for each net etiquette]

24. 0 False
1 False
2 True
3 False **[2]**
[½ mark for each correct output]

25. **(i)** The index labels of df will include Q1, Q2, Q3, Q4, A,B,C
(ii) The column names of df will be:1,2 **[2]**
[1 mark for each correct answer]

26. **(i)** 8
(ii) No Output
(iii) 0
15 **[3]** *[1 mark for each correct output]*

27. import pandas as pd data=[[101,'Gurman',98],[102,' Rajveer',95],[103,'Samar' ,96], [104,'Yuvraj',88]]
df=pd.DataFrame(data,columns=['Rno','Name', 'Marks']) **[3]**
[1 mark for each correct python statement]

28. **(i)** Stock['Special_Price']=[135,150,200,400]
(ii) Stock.loc['4']=['TheSecret',800]
(iii) Stock=Stock.drop('Special_Price',axis=1) **[3]**
[1 mark for each correct statement]

29. **(i)** Nadar has become a victim of cyber bullying and cybers talking.
(ii) She must immediately bring it into the notice of her parentsand school authorities. And she must report this cyber crime to local police with the help of her parents.
(iii) Yes.
The Information Technology Act, 2000 (also known as ITA-2000, or the IT Act) is the primary law in India dealing with cybercrime and electronic commerce. **[3]**
[1 mark for each correct answer]

OR

Plagiarism is the act of using or stealing some one else's in work, ideas etc. and passing it as your own work. In other words, plagiarism is a failure in giving credit to its source.
Plagiarism is a fraud and violation of Intellectual Property Rights. Since IPR holds a legal entity status, violating its owners right is a legally punishable offence.
Any two ways to avoid plagiarism:
- Be original
- Cite/acknowledge the source **[3]**

[1 mark for correct definition]
[1 mark for correct justification]
[½ mark each for any two ways to avoid plagiarism]

30. **(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; **[3]**

[1 mark for each correct query]

OR

GROUP BY clause is used in a SELECT statement in combination with aggregate functions to group the result based on distinct values in a column.

For example:

To display total number of male and female students from the table STUDENT, we need to first group records based on the gender then we should count records with the help of count() function.

Considering the following table STUDENT:

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

SQL query for the above-mentioned task is as follows:

select gender, count(gender) from student group by gender;

Output:

Gender	Count(Gender)
M	4
F	4

[1 mark for correct significance] [2 marks for correct example]

31. **(i)** select mid('INDIA SHINING',7,7);

(ii) select INSTR('WELCOME WORLD','COME');

(iii) select round(23.78,1);

(iv) select mod(100,9);

(v) select trim(userid) from users; **[5]**

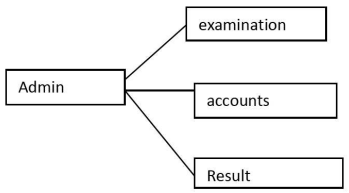
[1 mark for each correct query]

OR

1. **UCASE():** It converts the string into uppercase.
   Example:
   SELECT UCASE('welcome world');
   Output:
   WELCOME WORLD
2. **TRIM():** It removes the leading and trailing spaces from the given string.
   Example:
   SELECT TRIM(' Welcome world ');
   Output:
   Welcome world
3. **MID():** It extracts the specified number of characters from given string.
   Example:
   SELECT MID(' Welcome world,4,,4);
   Output:
   Come
4. **DAYNAME():** It returns the weekday name for a given date
   Example:
   SELECT DAYNAME('2022-07-22');
   Output:
   Friday
5. **POWER():** It returns the value of a number raised to the power of another number.
   Example:
   SELECT POW(6,2);
   Output:
   36 *[½ mark for each correct explanation] [½ mark for each correct example]*

32. **(i)** Server should be installed in Admin department as it has maximum number of computers.

(ii)



Star topology

(iii) Hub/Switch

(iv) Dynamic

(v) Video conferencing **[5]**

[1 mark for each correct answer]

33.
```
import matplotlib.pyplot as plt
Category=['Gold','Silver','Bronze']
Medal=[20,15,18]
plt.bar(Category,Medal)
plt.ylabel('Medal')
plt.xlabel('Medal Type')
plt.title('Indian Medal tally in Olympics')
plt.show()
```
[5]

[½ mark for each correct statement]

Python statement to save the chart: plt.savefig("aa.jpg")

[1 mark for the correct statement]

OR

```
import matplotlib.pyplot as plt
Week=[1,2,3,4]
Avg_week_temp=[40,42,38,44]
plt.plot(Week,Avg_week_temp)
plt.show()
```
[1 mark for each correct statement]

34. **(i)** SELECT LOWER(CNAME) FROM CLOTH;

(ii) SELECT MIN(PRICE) FROM CLOTH;

[1 mark for each correct query]

(iii) SELECT COUNT(*) FROM CLOTH GROUP BY SIZE HAVINGSIZE='M'; **[4]**

OR

SELECT YEAR(DOP),COUNT(*) FROM CLOTH GROUP BY YEAR(DOP); *[2 marks for correct query]*

35. **(a) Output:**

(i) (5,4) **[4]**

(ii)

	School	tot_students	Topper	First_Runner_up
CO3	GPS	20	18	2
CO4	MPS	18	10	8

[1 mark for each correct output]

(b) Python statement:

```
print(df.loc['CO2': 'CO4', 'Topper'])
```

OR

```
print(df.Tot_students-df.First_Runnerup)
```

[2 marks for correct Python statement]

■■■

Sample Question Paper-2

Informatics Practices

Class- XII [065]

SOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. Which of the following indexing capabilities is used as a concise means of selecting data from a pandas object?
(A) In **(B)** ix **(C)** ipy **(D)** iy AI **[1]**

2. What will be syntax for pandas dataframe?
(A) pandas.DataFrame(data, index, dtype, copy)
(B) pandas.DataFrame(data, index, rows, dtype, copy)
(C) pandas_DataFrame(data, index, columns, dtype, copy)
(D) pandas.DataFrame(data, index, columns, dtype, copy) **[1]**

3. plot() is used to create _____.
(A) line chart **(B)** bar chart **(C)** pie chart **(D)** histogram **[1]**

4. Which of the following is not a network topology?
(A) Star **(B)** Mesh **(C)** Tree **(D)** Gateway **[1]**

5. Which topology in general uses less wire length compare to other ?
(A) Star Topology **(B)** Ring Topology
(C) Bus Topology **(D)** All use same Length of Wire AI **[1]**

6. Intellectual property is legally protected by:
(A) copyright **(B)** patents **(C)** trademarks **(D)** all of these AI **[1]**

7. The following cannot be exploited by assigning or by licensing the rights to others.
(A) Patents **(B)** Designs **(C)** Trademark **(D)** All of the above **[1]**

8. Write the output of the following SQL command.
SELECT SUBSTR("WORLD",2,3);
(A) ORL **(B)** WO **(C)** WOR **(D)** LD **[1]**

9. What is the result of the following?
SELECT MOD (75, 8);
(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **[1]**

10. Write the output of the following SQL query-
SELECT POW (INSTR('Wonders','n'),3);
(A) 12 **(B)** 9 **(C)** 16 **(D)** 25 **[1]**

11. Which of the following digital footprints can be created without the user's consent?
(A) Active digital footprint **(B)** Passive digital footprint
(C) Massive digital footprint **(D)** Interactive digital footprint AI **[1]**

12. It is OK to forward or post an email message that you received if:
(A) the message is typed in all capitals.
(B) the author of the message has given you permission to forward or post it.
(C) it does not contain any copyrighted material.
(D) the author of the message hasn't marked it as confidential. **[1]**

13. 'F' in FOSS stands for:
(A) Free **(B)** Forever **(C)** Fire **(D)** Freezing **[1]**

14. Which type of values will not be considered by SQL while executing the following statement?
SELECT COUNT(column name) FROM Student;
(A) Null value **(B)** Integer value **(C)** Name value **(D)** Address value **[1]**

15. If column "Marks" contains the data set (500,800,750,500,800), what will be the output after the execution of the given query?
SELECT MAX (DISTINCT Fees) FROM College; AI
(A) 750 **(B)** 800 **(C)** 500 **(D)** Error **[1]**

16. Find the output of:
SELECT LEFT ('School', 2);
(A) Sc **(B)** ch **(C)** ol **(D)** Sch **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** SMTP stands for Simple Mail Transfer Protocol.
Reason (R): SMTP is the standard protocol for sending emails across the Internet. **[1]**

18. **Assertion (A):** The axis labels are collectively called index.
Reason (R): Pandas Series is nothing but a column in an excel sheet. **[1]**

Section - B

19. Distinguish between web browser and web server. **[2]**

OR

Priyanka, a beginner in IT field has just started learning web technologies. Help her in understanding the difference between website and web pages with the help of a suitable general example of each.

20. Explain the MOD( ) functions with an example. AI **[2]**

21. Consider the following SQL string: "Shutterstock"
Write commands to display:
(a) "stock"
(b) "ter" AI **[2]**

22. Give the output:

```
import pandas as pd
data = [['Alex', 10], ['Bob', 12], ['Claske', 13]]
df = pd.DataFrame (data, columns = ['Name','Age'])
print(df)
```
[2]

23. Write examples of identity theft. **[2]**

OR

What do you mean by copyright ? **[2]**

24. Differentiate between Series data structure and Dataframe data structure? **[2]**

25. Consider a given series, M1:

Index	Marks
Term 1	45
Term 2	65
Term 3	24
Term 4	89

Write a program in Python Pandas to create the series. **[2]**

Section - C

26. Given SchoolBus table as follows **[3]**

Rtna	Area_Covered	Capacity	Noofstudents	Distance	Transporter	Charges
1.	Vasant Kunj	100	120	10	Shivam Travels	100000
2.	Hauz Khas	80	80	10	Anand Travels	85000
3.	Patampura	60	55	30	Anand Travels	60000
4.	Rohini	100	90	35	Anand Travels	100000
5.	Yamuna Vihar	50	60	20	Bhalla Travels	55000
6.	Krishna Nagar	70	80	30	Yadav Travels	80000
7.	Vasundhara	100	110	20	Yadav Travels	100000
8.	Paschim Vihar	40	40	20	Speed Travels	55000
9.	Saket	120	120	10	Speed Travels	100000
10.	Janakpuri	100	100	20	Kisan Tours	95000

What values will the following statements return?

(a) select sum(Distance) from SchoolBus where Transporter="Yadav travels";

(b) select min(Noofstudents) from SchoolBus;

(c) select avg(Charges) from SchoolBus where Transporter="Anand travels";

27. How to import pandas library? **[3]**

28. In a Dataframe how will you change : **[3]**

(i) a column

(ii) a row

(iii) an individual data value

29. What is software license? Also write its types. **[3]**

OR

How technology affects the following things:

(i) Eyes strain

(ii) Sleep disorders

(iii) Physical inactivity

30. Name any one single row function and any one aggregate function. Also mention the difference in their working. **[3]**

OR

Write the output of the following SQL queries :

(i) SELECT INSTR('INFORMATION TECHNOLOGY', 'TECH');
(ii) SELECT LENGTH(CONCAT('HEALTH', 'WEALTH'));
(iii) SELECT RIGHT("PUBLICATION WORLD",4);

Section - D

31. Which function extracts a given number of characters from the right side of a specified character string? Explain with example. **[5]**

OR

Consider a table ABC with following fields:
PID
City
Name
Pin_Code
Gender
Basic_salary
Write SQL commands to :

(i) Display the name and city of all the females getting Basic Salary above 40,000.
(ii) Display Name and Basic salary of all the persons whose name starts with 'G'.
(iii) Delete the record of those whose pin code is 182141.
(iv) Display PID, City and Pin code of ABC in descending order of pin code.
(v) Identify the primary key from table ABC.

32. Perfect Edu services Ltd. is as educational organization. It is planning to setup its India campus at Karnataka with its head office at Delhi. The Karnataka campus has 4 main buildings - ADMIN, ENGINEERING, BUSINESS and MEDIA.
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 Engineering	55 mt
Admin to Business	90 mt
Admin to Media	90 mt
Engineering to Business	55 mt
Engineering to Media	90 mt
Business to Media	456 mt
Delhi head office to Karnataka Campus	2175 km

Number of computers installed at various buildings are a follows :

Admin	110
Engineering	75
Business	40
Media	12
Delhi Head Office	20

(i) Suggest the most appropriate location of the server inside the Karnataka campus to get the best connectivity for maximum no. of computers.
(ii) Draw the cable layout to efficiently connect various building with the Karnataka campus for connecting the computers.

(iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet usage within the campus ?

(iv) Which of the following will you suggest to establish the online face to face communication between the people in the admin office Karnataka campus and Delhi Head office

- E-mail
- Text Chat
- Video Conferencing
- Cable TV

(v) Suggest a device and protocol that shall be needed to provide wireless Internet access to all smartphone/ laptop users in the Karnataka campus. **[5]**

33. Consider a Dataframe study having following data where 1, 2, 3, 4, 5, 6 are index labels that represent Roll Nos. **[5]**

RollNo.	Name	Sub1	Sub2	Sub3
1.	Anubhav	56	91	63
2.	Tishya	39	78	45
3.	Arnav	80	33	78
4.	Siddhant	78	42	23
5.	Garvit	23	98	43
6.	Gungun	38	89	56

(i) Which method is used to delete row from dataFrame?

(ii) Print data type of column sub3.

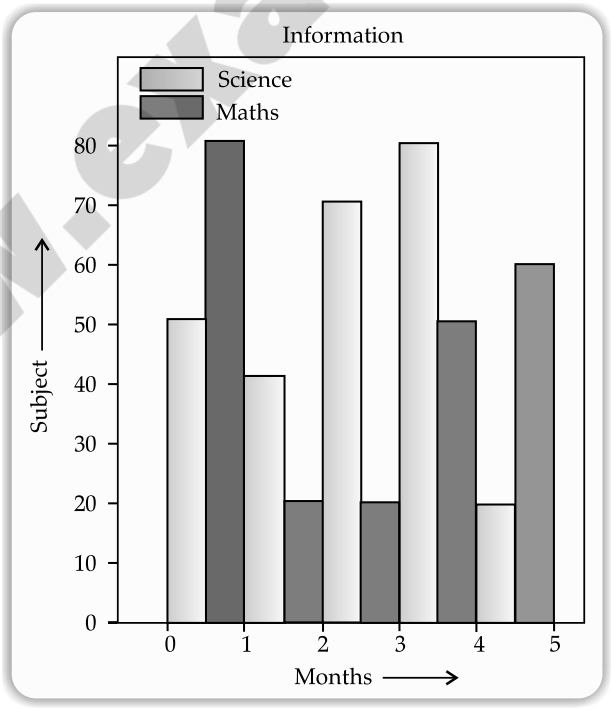
(iii) Print record of student named 'Siddhant'.

(iv) Print record of rollnos between 2 and 6(both included).

(v) Print total number of columns.

OR

Write the code for given bar graph



Section - E

Case based Subjective Questions

34. Consider the table EXAM given below.

Table: EXAM

No.	Name	Stipend	Subject	Average	Division
1.	Karan	400	English	68	FIRST
2.	Aman	680	Mathematics	72	FIRST
3.	Javed	500	Accounts	67	FIRST
4.	Bishakh	200	Informatics	55	SECOND
5.	Sugandha	400	History	35	THIRD
6.	Suparna	550	Geography	45	THIRD

(i) To list the names of those students who have obtained DIVISION as FIRST in the ascending order of NAME. **[1]**

(ii) To count the number of students who have either accounts or informatics as subject. **[1]**

(iii) SELECT COUNT(DISTINCT Subject) FROM EXAM; **[2]**

OR (Option for part iii only)

SELECT MIN(Average) from EXAM WHERE Subject="English";

35. Consider the following DataFrame df

ID	Name	Age	Fav_Color	Points
T01	Rahul Anand	32	Blue	73
T02	Mohak Girdhar	25	Green	82
T03	Rajeev Tyagi	45	Orange	29
T04	Rohini Malik	30	Pink	39

(a) Answer the following questions

(i) Write down the command that will add a column "eligible" with default values as 'yes'. **[1]**

(ii) Which command will be used to drop a row from dataframe 'df' labelled as 'T04' ? **[1]**

(iii) Write the command to extract the complete row 'T03' and also define this command. **[2]**

OR (Option for part iii only)

Write the statement to list the first three entries of the DataFrame 'df'. Also, define this command.

■■■

Sample Question Paper-3

Informatics Practices

Class- XII [065]

SOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. The data of any CSV file can be shown in which of the following software?
(A) MS Word **(B)** Notepad **(C)** Spreadsheet **(D)** All of the above **[1]**

2. Which method is used to delete row(s) from DataFrame?
(A) .drop() method **(B)** .del() method **(C)** .remove() method **(D)** .delete() method **[1]**

3. Sandhya wants to display the last four rows of the dataframe df and she has written the following command:

```
df.tail()
```

But the first 5 rows are being displayed. To rectify this problem, which of the following statements should be written?
(A) df.head() **(B)** df.last(4) **(C)** df.tail(4) **(D)** df.rows(4) **[1]**

4. Write the output of the following SQL command:

```
select round(49.88);
```

(A) 49.88 **(B)** 9.8 **(C)** 49.0 **(D)** 50 **[1]**

5. The substr() function in MySql is an example of ..... .
(A) Math function **(B)** Text function **(C)** Date Function **(D)** Aggregate Function **[1]**

6. To specify condition with a GROUP BY clause, _____ clause is used.
(A) USE **(B)** WHERE **(C)** HAVING **(D)** LIKE **[1]**

7. For web pages where the information is changed frequently, for example, stock prices, weather information which out of the following options would you advise ?
(A) Static webpage **(B)** Dynamic webpage **(C)** Both A and B **(D)** None of the above **[1]**

8. Which network topology has a central device, which brings all the signals together?
(A) Bus **(B)** Star **(C)** Ring **(D)** Hybrid **[1]**

9. _____deals with the protection of an individual's information which is implemented while using the Internet on any computer or personal device.
(A) Digital agony **(B)** Digital privacy **(C)** Digital secrecy **(D)** Digital protection **[1]**

10. Which of the following is not 'open source' software?
(A) Linux **(B)** Ubuntu **(C)** Open office **(D)** windows 10 **[1]**

11. E-waste is becoming one of the fastest growing environmental hazards in the world today. If it is not properly treated or disposed of it can cause serious health hazards, therefore, The _____ has issued a formal set of guidelines for proper handling and disposal of e-waste.
(A) Central Pollution Control Board (CPCB) **(B)** Department of Information Technology (DIT)
(C) Electrical and Electronic Equipment (WEEE) **(D)** Information Communication Technology (ICT) [1]

12. Which of the following is one of the impacts of e-waste on the environment?
(A) Global Warming **(B)** deforestation **(C)** soil erosion **(D)** emission of gases **[1]**

13. What is/are component of IT Act 2000 ?
(A) Legal Recognition to Digital Signatures **(B)** Regulation of Certification Authorities
(C) Digital Certificates **(D)** All the above **[1]**

14. Find the output of
SELECT RIGHT ('School', 2);
(A) Sc **(B)** ch **(C)** ol **(D)** Sch **[1]**

15. Which of the following option is correct output for below statement?
SELECT LEFT ('Program', 4);
(A) Prog **(B)** gram **(C)** rogr **(D)** None **[1]**

16. If column "Point" contains the data set (5,8,7,5,8), what will be the output after the execution of the given query?
SELECT MIN (DISTINCT Point) FROM School;
(A) 7 **(B)** 8 **(C)** 5 **(D)** Error **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** To create a series from array, we have to import the NumPy module and then use array () method.
Reason (R): NumPy is an open-source numerical Python library. NumPy contains a multi-dimensional array and matrix data structures. [1]

18. **Assertion (A):** Cookies are plain text files.
Reason (R): Cookies store the Profile picture on Social Media. [1]

Section - B

19. Expand the following terms related to computer networks:
(a) HTTP
(b) HTML
(c) POP3
(d) IP **[2]**

OR

Aman, a freelance web site developer, has been assigned a task to design few web pages for a book shop. Help Aman in deciding out of static web page and dynamic web page, what kind of web pages should be designed by clearly differentiating between static and dynamic web pages on at least two points **[2]**

20. Explain COUNT() function with an example. [2]

21. Consider the table Hotel given below:

Table : Hotel

EmpID	Category	Salary
E101	Manager	60000
E102	Executive	65000
E103	Clerk	40000
E104	Manager	62000
E105	Executive	50000
E106	Clerk	35000

Mr. Vinjay wanted to display average salary of each category. He entered the following SQL statement. Identify error(s) and rewrite the correct SQL statement.

SELECT Category, Salary FROM Hotel GROUP BY Category; [2]

22. Which library is used for plotting in Python language? [2]

23. Define the following terms with respect to IPR :

(a) Legal and Legislative Framework

(b) Enforcement and Adjudication [2]

OR

Write a short note on netiquettes.

24. List any two key features of Pandas. [2]

25. What is Pandas? [2]

Section - C

26. Consider the table FLIGHT given below. Write SQL command for (i), (ii) and output for (iii).

FLCode	Start	Destination	No_Stops	No_Flights
IC101	Delhi	Agartala	1	5
IC102	Mumbai	Sikkim	1	3
IC103	Delhi	Jaipur	0	7
IC105	Kanpur	Chennai	2	2
IC107	Mumbai	Kanpur	0	4
IC431	Indore	Chennai	3	2
IC121	Delhi	Ahmedabad	2	6

(i) Display flight codes, starting place, destination, number of flights in descending order of number of flights.

(ii) Display flight codes and starting place whose destination is Jaipur

(iii) SELECT MAX(NO_FLIGHTS) FROM FLIGHT; [3]

27. Define the head() and tail() functions. [3]

28. Write code for selecting a column from the DataFrame. [3]

29. How our private information can be stolen? [3]

OR

What is e-waste management? Explain how can we control e-waste?

30. Write the output of the following SQL queries :

(i) SELECT MID ('VisitIndia', 6, 5);

(ii) SELECT round (89.387, 2); [3]

(iii) SELECT POWER (5, 4);

OR

Considering the string "Programming"
Write SQL commands to display:

(i) The position of the substring 'gram' in the string "Programming"

(ii) The first 5 letters of the given string

(iii) The last 3 letters of the given string

Section - D

31. What is mathematical function? Explain any two mathematical functions with an example.

OR

Tejasvi Sethi, a car dealer has stored the details of all cars in her showroom in a table called CARMARKET. The table CARMARKET has attributes CARCODE which is a primary key, CARNAME, COMPANY, COLOR, COST (in lakh rupees) of the car and DOM which is the Date of Manufacture of the car. Answer. any four questions based on the table CARMARKET from the below mentioned questions

Table: CARMARKET

CARCODE	CARNAME	COMPANY	COLOR	COST	DOM
CO1	BALEND	SIZUKI	BLUE	5.90	2019-11-07
CO2	INDIGO	TATA	SILVER	12.90	2020-10-15
CO3	GLC	MERCEDES	WHITE	62.38	2020-01-20
CO4	A6	AUDI	RED	58.55	2018-12-29
CO5	INNOVA	TOYOTA	BLACK	32.82	2017-11-10
CO6	WAGON-R	SUZUKI	WHITE	12.11	2016-11-11
CO7	BREZZA	SUZUKI	GOLDEN	9.80	2016-10-03

Write SQL commands for the statements (i) to (iv) and answer the question for (v)

(i) Display the carname along with the charges rounded off to 1 digit after decimal place.

(ii) Display the carname, color and position of the character 'E' in the color of all the cars

(iii) Display the carname, name of the company in lower case of all cars whose year (of dom) is 2020.

(iv) Display the number of cars manufactured each year.

(v) What is the cardinality and degree of the table CARMARKET? **[5]**

32. Delhi Public School in Meerut is starting up the network between its different wings. There are four building named as S,J, A and H. The distance between various buildings is as follows :

A to S 200 mt
A to J 150 mt
A to H 50 mt
S to J 250 mt
S to H 350 mt
J to H 350 mt

Number of computers in each building :

S 130
J 80
A 160
H 50

(i) Suggest the cable layout of connections between the buildings.

(ii) Suggest the most suitable place (i.e. building) to house the server of this school, provide a suitable reason.

(iii) Suggest the placement of the following devices with justification.

- Repeater
- Hub/ switch

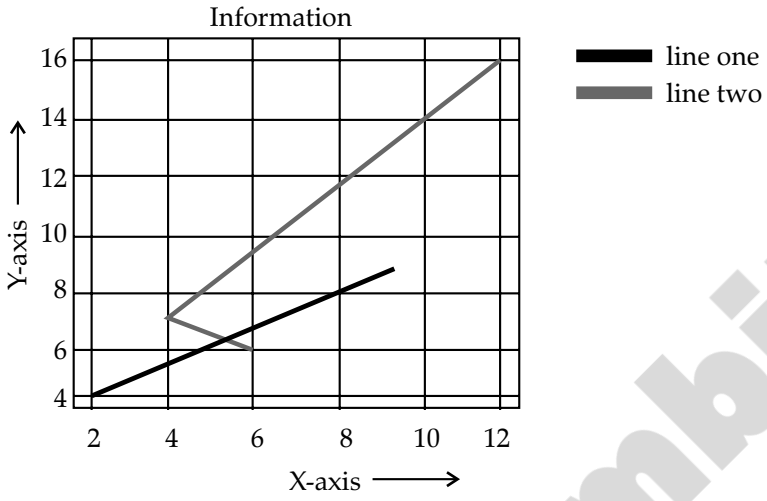
(iv) The organization also has enquiry office in another city about 50-60 km away in hilly region. Suggest the suitable transmission media to inter-connect school and enquiry office out of the following :
- Fibre optic cable
- Micro wave
- Radio wave

(v) The school is planning to connect its A building in the closest big city, which is more than 400 km from school. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer. **[5]**

33. Define the DataFrame.Write a code for adding a new column to an existing dataframe. **[5]**

OR

Write the code which will represent the following plot.



Section - E

Case based Subjective Questions

34. Consider the following table and answer the given questions

Table Name: Library

Acsn_no	B_name	DOB	Price	Chapter	City
101	Abcd	2000-11-01	98	19	Delhi
102	Rxyz	1999-10-02	65.8	18	Kolkata
103	Azxc	2000-05-00	99	20	Delhi
104	Sven	1998-10-12	69.8	17	NULL

(i) What will be the output of the following query? SELECT MID(City,4,3) FROM LIBRARY WHERE Acsn_no=102; **[1]**

(ii) What will be the output of the following query? **[1]**

SELECT UCASE(City) FROM LIBRARY WHERE Acsn_no=103;

(iii) What will be the output of the following query? Also, define the LEFT() function. **[2]**

SELECT LEFT(City,3) FROM LIBRARY WHERE Chapter=18;

OR (Option for part iii only)

What will be the output of the following query? Also, define the LENGTH() function. **[2]**
SELECT LENGTH(B_name) FROM LIBRARY WHERE B_name LIKE '%b%';

35. Mr. Ankit is working in an organisation as data analyst. He uses Python Pandas and Matplotlib for the same. He got a dataset of the passengers for the year 2010 to 2012 for January, March and December. His manager wants certain information from him, but he is facing some problems. Help him by answering few questions given below:

	Year	Month	Passengers
0	2010	Jan	25
1	2010	Mar	50
2	2012	Jan	35
3	2010	Dec	55

Code to create the above data frame:

```
import pandas as _____                                    #Statement 1
data={"Year":[2010,2010,2012,2010],"Month":["Jan","Mar","Jan","Dec"],"Passengers":[25,50,35,55]}
df=pd._____(data)                                         #Statement 2
print(df)
```

(a) Answer the question

(i) Choose the right code from the following for statement 1 **[1]**

(ii) Choose the right code from the following for the statement 2 **[1]**

(b) He wants to print the details of "January" month along with the number of passengers. Identify the correct statement: **[2]**

	Month	passengers
0	Jan	25
1	Jan	35

OR (Option for part iii only)

Mr. Ankit wants to change the index of the Data Frame and the output for the same is given below. Identify the correct statement to change the index.

	Year	Month	Passengers
Air India	2010	Jan	25
Indigo	2010	Mar	50
Spicejet	2012	Jan	35
Jet	2010	Dec	55
Emirates	2012	Dec	65

■■■

Sample Question Paper-4

Informatics Practices

Class- XII [065]

SOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. Write the output of the following SQL command.
select substr("COMPUTER",3,4);
(A) MPUT **(B)** PUTE **(C)** PU **(D)** MP **[1]**

2. Given a Pandas series called sequences, the command which will display the first 4 rows is _____.
(A) print (sequences.head(4)) **(B)** print (sequences.Head(4))
(C) print (sequences.heads(4)) **(D)** print (sequences.Heads(4)) **[1]**

3. Identify the correct option to select first four rows and second to fourth columns from a DataFrame 'Data':
(A) display(Data.iloc[1: 4, 2: 4]) **(B)** display(Data.iloc[1: 5, 2: 5])
(C) print(Data.iloc[0: 4, 1: 4]) **(D)** print(Data.iloc[1: 4, 2: 4]) **[1]**

4. To change the width of bars in a bar chart, which of the following arguments with a float value is used?
(A) hwidth **(B)** width **(C)** breath **(D)** barwidth **[1]**

5. The avg() function in MySql is an example of ..... .
(A) Math function **(B)** Text function **(C)** Date function **(D)** Aggregate function **[1]**

6. Only _____ functions are used with GROUP BY clause.
(A) Text **(B)** Math **(C)** Date/Time **(D)** AGGREGATE **[1]**

7. Which of the following is not a network device?
(A) Hub **(B)** Switch **(C)** Mesh **(D)** Router **[1]**

8. The two basic parts of URLs are
(A) TCP and FTP **(B)** The protocol and the domain name
(C) TCP/IP and ISP **(D)** Destination and device **[1]**

9. One limitation of antivirus programs is that they:
(A) Sometimes start behaving like virus
(B) Are very expensive

(C) Harm the computer
(D) Can detect only those viruses for which they are programmed **[1]**

10. With the outset of Covid-19 schools started online classes but due to continuous online classes students health issues also started. Health practitioner advised the parents to follow a few health tips. Which of the following health tips should not be suggested?
(A) The sitting posture should be correct.
(B) Breaks should be taken in between the online classes.
(C) To protect the eyes the gadgets be placed above eye level.
(D) Wash the eyes regularly **[1]**

11. Which of the following is not covered under IPR ?
(A) Music **(B)** Insurance **(C)** Logo designed **(D)** Invention **[1]**

12. Which of the following is a/an open-source software?
(A) Microsoft Windows **(B)** Adobe Photoshop **(C)** MySQL **(D)** MS Powerpoint **[1]**

13. Priya is a student of class 10 and she is a very frequent user of internet applications. One day she got an unpleasant message on her instant messenger. What do you think she should do?
(A) Start chatting with an unknown person.
(B) Talk to her parents/teacher or other trusted adult and let them know that she is feeling uncomfortable.
(C) Ignore the conversation.
(D) She should delete the chat so that no one comes to know **[1]**

14. Which of the following option is correct output for below statement?
SELECT LEFT ('Wonders World', 3);
(A) Won **(B)** Wor **(C)** Won Wor **(D)** None **[1]**

15. If column "Grade" contains the data set (5,8,7,5,8), what will be the output after the execution of the given query?
SELECT SUM (DISTINCT Grade) FROM Exam;
(A) 7 **(B)** 8 **(C)** 5 **(D)** 20 **[1]**

16. To sort a result set in ascending order, we can use _____ keyword with ORDER BY clause
(A) AASC **(B)** ASC **(C)** DESC **(D)** ASCEND **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** Iteration is a general term for taking each item of something one after another.
Reason (R): itertuples()returns the iterator yielding each index value along with a series containing the data in each row. **[1]**

18. **Assertion (A):** A router is more powerful and intelligent than hub or switch.
Reason (R): It has advanced capabilities as it can analyze the data and decide the data is packed and send it to the other network. **[1]**

Section - B

19. Differentiate between internet and intranet. **[2]**

OR

Navya has just created a website for her company and now need to host it. Briefly discuss the role of a web server in hosting a website.

20. What is the use of the functions LCASE ( ) and UCASE ()? **[2]**

21. Consider the following SQL string: "Environment"
Write commands to display:
(a) "ronment"
(b) "ment" **[2]**

22. What are the benefits of Pandas? AI **[2]**

23. What is Cyber Crime? **[2]**

OR

How is cultural change induced by technology?

24. Give the output of the code

```
import pandas as pd
a = pd.DataFrame ([1, 1, 1, None], index = ['a','b', 'c', 'd'], columns = ['one'])
print(a)
```

[2]

25. What is histogram? **[2]**

Section - C

26. Table Emp is shown below. Write commands in SQL

ID	Name	Age	Address	Salary	Phone
1	Siddarth	25	A-4, Ashok Vihar, Delhi	62000	9811076663
2	Chavi	23	B-21, Model Town, Mumbai	71000	9911342398
3	Karan	26	KC-24, North Avenue, Bhopal	65000	9810539357
4	Raunaq	22	A-152, Gomti Nagar, Lucknow	89000	9910139357
5	Kunal	27	B-5/45, Uday Park, Delhi	80000	9765345565

(i) To list names and respective salaries in descending order of SALARY.
(ii) To count the number of employees with names starting with 'K'.
(iii) To display the name and address of employees whose age is greater than 25. **[3]**

27. Consider two objects x and y. x is a list whereas y is a Series. Both have values 10, 30, 70, 120.
What will be the output of the following two statements considering that the above objects have been created already?
(a) print (x*3)
(b) print(y*3)
Justify your answer. **[3]**

28. What will be the output of the following code?

```
from matplotlib import pyplot as plt
x=[4, 8, 3]
y=[1, 6, 9]
plt.plot(x, y)
plt.title ('Details')
plt.ylabel('Y axis')
plt.xlabel ('X axis')
plt.show( )
```

[3]

29. Explain Privacy Laws. **[3]**

OR

How open data is useful? AI

30. Write the output of the following SQL queries:
(i) SELECT MID ('Board Examination', 2, 4);
(ii) SELECT INSTR ('INFORMATION FROM', 'FOR');
(iii) SELECT LENGTH ('Board Examination'); **[3]**

OR

Considering the same string "Environment"
Write SQL commands to display:
(i) The position of the substring 'ment' in the given string.
(ii) The first 3 letters of the string.
(iii) The length of given string.

Section - D

31. What are SQL group functions?

OR

A Departmental store 'Iconic' is planning to automate its system so that they can store all the records on computer. They contacted a Software Company to make the software for the same. The company suggested that there is need of a front end and back-end software. The major challenge was to keep the record of all the items available in the store. To overcome the problem, the software company has shown the glimpses of the database and table required to resolve their problem:

Database Name: Iconic

Table Name: Garment

Attributes of the table: Gcode – Numeric, Gname – Character 25, Size - Character 5, Colour – Character 10, Price – Numeric

Consider the following records in 'Garment' table and answer the given questions:

Table : GARMENT

GCODE	GNAME	SIZE	COLOUR	PRICE
111	Tshirt	XL	Red	1,400.00
112	Jeans	L	Blue	1,600.00
113	Skirt	M	Black	1,100.00
114	Jacket	XL	Blue	4,000.00
115	Trousers	L	Brown	1,500.00
116	Ladies Top	L	Pink	1,200.00

(i) Write the command that will give the output as

COLOUR
BLU
BLA
BLU
BRO

(ii) Write SQL statement to delete the record with GCode as 116.

(iii) Give the output of :
Select GName, Price from GARMENT order by Price Desc;

(iv) The correct command to change the colour of GARMENT with code as 116 to "Orange".

(v) What is the degree and cardinality of 'GARMENT' table? **[5]**

32. Rovenza Communications International (RCI) is an online corporate training provider company for IT related courses. The company is setting up their new campus in Kolkata. You as a network expert have to study the physical locations of various blocks and the number of computers to be installed. In the planning phase, provide the best possible answers for the queries (i) to (v) raised by them.

Block to block distances (in meters)

From	To	Distance
Administrative	Finance	60
Administrative	Faculty Studio	120
Finance	Faculty Studio	70

Expected Computers to be installed in each block

Buildings	Computers
Administrative	20
Finance	40
Faculty studio	120

(i) Suggest the most appropriate block, where RCI should plan to install the server.

(ii) Suggest the most appropriate block to block cable layout to connect all three blocks for efficient communication.

(iii) Which type of network out of the following is formed by connecting the computers of these three blocks?
- LAN
- MAN
- WAN

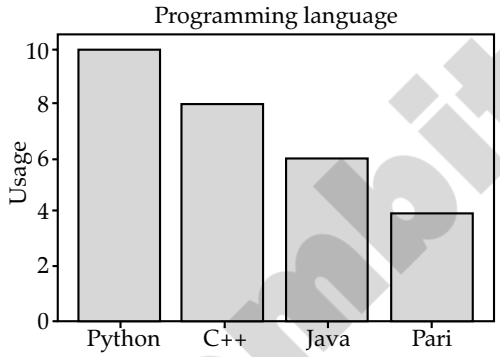
(iv) Which wireless channel out of the following should be opted by RCI to connect to students from all over the world?
- Infrared
- Microwave
- Satellite

(v) RCI is planning to link its another block in the city located in the hilly region where cable connection is not feasible. Suggest an economic way to connect it with reasonably high speed. Justify your answer. **[5]**

33. Explain the data structure in Pandas. **[5]**

OR

Write the code to draw following graph:



Section - E

Case based Subjective Questions

34. Consider the following table and answer the given questions.

Table Name: STUD

Admno	S_Name	Adm_Date	Maks
501	Arup	2000-11-01	98
502	Raj	1999-10-02	65.8
503	Aman	2000-05-01	99
504	Saroj	1998-10-02	69.8

(i) What will be the output of the following query? **[1]**
SELECT MIN(Admno) FROM STUD;

(ii) What will be the output of the following query? **[1]**
SELECT COUNT(*) FROM STUD;

(iii) What will be the output of the following query? Also, define the round() function. **[2]**
SELECT ROUND(SUM(marks)) FROM STUD;

OR (Option for part iii only)

What will be the output of the following query? Also, define the MAX() function.
SELECT MAX(Adm_date) FROM STUD;

35. Consider the below code

```
import pandas as pd
list1=[1,2,3,4,5,6,7,8]
list2=['swimming','tt','skating','kho kho', 'bb', 'chess', 'football',"cricket"]
```

```
school=pd.Series(list1,index=list2)
school.name=("little")
print (school*2)
        #statement 1
print (school.tail(3))
        # statement 2
print (school["tt"])
        # statement 3
print (school[2:4])
        # statement 4
```

(a) **(i)** Choose the correct name of the series object given above **[1]**

(ii) Choose the correct output for the statement: **[1]**
print (school["tt"]) # statement 3

(b) The correct output of the statement: **[2]**
print (school*2) # statement 1

OR (Option for part iii only)

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

■■■

Sample Question Paper-5

Informatics Practices

Class-XII [065]

SOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. Python Pandas was developed by:
(A) Guido van Rossum **(B)** Travis Oliphant **(C)** Wes McKinney **(D)** Brendan Eich **[1]**

2. Consider the following series named animal:

```
L    Lion
B    Bear
E    Elephant
T    Tiger
W    Wolf
dtype: Object
```

Write the output of the command:
print(animal[::-3])

(A)
```
L    Lion
T    Tiger
dtype: object
```

(B)
```
B    Bear
E    Elephant
dtype: object
```

(C)
```
W    Wolf
B    Bear
dtype: object
```

(D)
```
W    Wolf
T    Tiger
dtype: object
```

[1]

3. _____is used for 2D plots in Python.
(A) pandas **(B)** tkinter **(C)** math **(D)** matplotlib **[1]**

4. We apply the aggregate function to a group of sets of tuples using the clause.
(A) group by **(B)** group **(C)** group set **(D)** group attribute **[1]**

5. What values does the count(*) function ignore?
(A) Repetitive values **(B)** Null values **(C)** Characters **(D)** Integers AI **[1]**

6. What is the meaning of "GROUP BY" clause in Mysql?
(A) Group data by column values **(B)** Group data by row values
(C) Group data by column and row values **(D)** None of these AI **[1]**

7. The main computer in any network is called as:
(A) Client **(B)** Server **(C)** Switch **(D)** Hub **[1]**

8. Repeaters work on the _____ layer.
(A) Network Layer **(B)** Physical Layer **(C)** Application Layer **(D)** All of the Above AI **[1]**

9. The digital footprint can be saved in which of the following locations?
(A) Download folder **(B)** User account
(C) Browser settings and web server **(D)** Google Drive **[1]**

10. The term "Intellectual Property Rights" covers:
(A) Copyrights **(B)** Trademarks **(C)** Patents **(D)** All of these **[1]**

11. Suhana is down with fever. So, she decided not to go to school next day. Next day, in the evening she called up her classmate, Shaurya and enquired about the computer class. She also requested him to explain the concept. Shaurya said, "Mam taught us how to use tuples in python". Further, he generously said, "Give me some time, I will email you the material which will help you to understand tuples in python". Shaurya quickly downloaded a 2-minute clip from the Internet explaining the concept of tuples in python. Using video editor, he added the text "Prepared by Shaurya" in the downloaded video clip. Then, he emailed the modified video clip to Suhana. This act of Shaurya is an example of:
(A) Fair use **(B)** Hacking
(C) Copyright infringement **(D)** Cyber crime **[1]**

12. The trademark product is denoted by _____ symbols.
(A) ® or ™ **(B)** © **(C)** ! **(D)** None of these **[1]**

13. _____ is a cybercrime in which a target or targets are contacted by email, telephone or text message by someone posing as a legitimate institution to lure individuals into providing sensitive data such as personally identifiable information, banking and credit card details, and passwords.
(A) Plagiarism **(B)** Phishing **(C)** Cyber stalking **(D)** Hacking **[1]**

14. Find the output of
SELECT LEFT ('Grooming', 2);
(A) Gr **(B)** oo **(C)** om **(D)** Gro **[1]**

15. A column "Avg" contains the values (6,8,7,6,8), what will be the output after the execution of the given query?
SELECT AVG (DISTINCT Avg) FROM DATA;
(A) 7 **(B)** 8 **(C)** 5 **(D)** Error **[1]**

16. To sort a result set in descending order, we can use _____ keyword with ORDER BY clause
(A) AASC **(B)** ASC **(C)** DESC **(D)** ASCEND **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** Mesh topology offers excellent connectivity over long distances.
Reason (R): In Mesh topology each node is connected to more than one device. AI **[1]**

18. **Assertion (A):** A bar graph shows comparisons among discrete categories.
Reason (R): One axis of the chart shows the specific categories being compared. **[1]**

Section - B

19. What is a server? **[2]**

OR

ABC Company wants to link its computers in the Head office in New Delhi to its office in Sydney. Name the type of Network that will be formed. Which communication media should be used to form this Network ?

20. Gopi Krishna is using a table Employee. It has the following columns :
Code, Name, Salary, Deptcode He wants to display maximum salary department wise. He wrote the following command:
SELECT Deptcode, Max(Salary) FROM Employee;
But he did not get the desired result. Rewrite the above query with necessary changes to help him get the desired result. **[2]**

21. State the difference between NOW ( ) and SYSDATE ( ) functions. AI **[2]**

22. What is series? Explain with an example. AI **[2]**

23. Explain passive digital footprint. **[2]**

OR

What is licensing? AI

24. Give the output of the code

```
import pandas as pd
a = pd.DataFrame ([1, 2, None, 3], index = ['One', 'Two','Three', 'Four'],
columns = ['First'])
print(a)
```

[2]

25. Give an example to create a DataFrame. **[2]**

Section - C

26. Consider the table: ITEM

PRODUCT_ID	PRODUCT_CODE	QTY	PRICE
101	PEN	500	20.00
102	PEN	800	10.00
103	PEN	1000	20.00
104	PENCIL	700	10.00
105	PENCIL	800	20.00

Write SQL commands for:
(a) To sum the price of product PEN.
(b) To display product id and quantity of those items whose price is less than 15.
(c) To display the details of those items whose quantity is 1000. **[3]**

27. Consider two objects x and y. x is a list whereas y is a Series. Both have values 30, 40, 90, 150.
What will be the output of the following two statements considering that the above objects have been created already?
(a) print (x*2)
(b) print(y*2)
Justify your answer. **[3]**

28. Write code to draw a histogram. **[3]**

29. What to do if you are a victim of identity theft? **[3]**

OR

Discuss the social issues and cultural impact induced by technology. AI

30. Explain MAX () function with an example.

OR

Considering the same string "Communication"
Write SQL commands to display:

(i) The position of the substring 'cat' in the given string
(ii) The first 6 letters of the string
(iii) The length of given string **[3]**

Section - D

31. A Fashion Store MyStore is considering to maintain database of their Customers in SQL to store the data, As a Database Administrator Hina has decided that

Name of the database: MyStore
Name of the table: Customer
Attributes of the tables: Acc_No – Numeric, Cust_Name – Character 25, Cust_City - Character 25, Cust_Phone - Character 11, Open_Bal – Numeric Consider the following records in 'Customer' table and answer the given questions: **[5]**

Table: Customer

Acc_No	Cust_Name	Cust_City	Cust_Phone	Open_Bal
1001	Dhashmesh	Ambala	9710557614	10,000
1002	Sanya	Patna	8223545233	15,000
1003	Joe	New delhi	9972136576	13,000
1004	Mrinal	New delhi	9321305453	12,000
1005	Ishaan	Agra	9809876798	19,000

(i) With reference to the above given table, give query for generating following output

Cust_Name
Dhashmesh
Sanya
Ishaan

(ii) Give the output of :
Select Cust_Name, Open_Bal from Customer order by Open_bal;

(iii) Pranay has given the following command to obtain Highest Opening Balance of each City Select max(Open_Bal) from Customer where group by Cust_City; but he is not getting the desired result. Help him by writing the correct command

(iv) Help Pranay find the total no. of records having open_bal between 15000 to 20000 by writing the right command

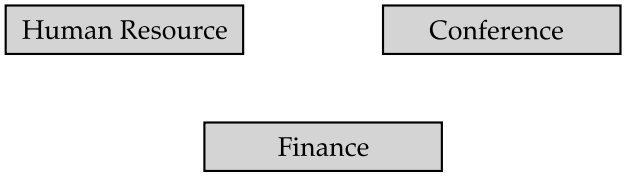
(v) The correct command to display the first two letters of each customer's name

OR

Discuss clauses that used in SQL queries with examples.

32. XYZ is professional consultancy company. The company is planning to set up their new offices in India with its hub at Pune. As a network adviser, you have to understand their requirement and suggest them the best available solutions. Their queries are mentioned as (i) to (v) below :

Physical locations of the blocks



Block to Block distance (in Metres) :

From	To	Distance
Human Resource	Conference	110
Human Resource	Finance	40
Conference	Finance	80

Expected number of computers to be installed in each block :

Block	Computers
Human Resource	25
Finance	120
Conference	90

(i) What will be the most appropriate block, where XYZ should plan to install their server ?

(ii) Draw a block diagram showing cable layout to connect all the buildings in the most appropriate manner for efficient communication.

(iii) What will be the best possible connectivity out of the following you will suggest to connect the new setup of offices in Chennai with its London based office.
- Satellite link
- Infrared
- Ethernet cable

(iv) Which of the following device will be suggested by you to connect each computer in each of the buildings?
- Switch
- Modem
- Gateway

(v) Which type of network out of the following is formed by connecting the computers of these three blocks?
- LAN
- MAN
- WAN

[5]

33. Explain the indexing in Pandas. **[5]**

OR

Write the code to draw the bar graph for the given data:

Item	Food	Clothing	Education	Misc	Savings
Amt (in ₹)	2100	600	1200	1500	1000

Section - E

Case based Subjective Questions

34. Consider the following table and answer the given questions.

Table Name: DEPT

Acsn no	D_ Name	DOB	Rank	Num_ Years	DoJ
1	Comp	2000-11-01	98	19	2010-18-16
2	Elec	1999-10-02	65.8	18	2020-05-12
3	Fin	2000-05-01	99	20	2020-04-14
4	Safety	1998-10-02	69.8	17	2022-04-01

(i) What will be the output of the following query? **[1]**

```
SELECT D_name FROM Dept WHERE DoJ = (SELECT MAX(DoJ) FROM Dept);
```

(ii) What will be the output of the following query? **[1]**

```
SELECT D_name FROM Dept WHERE Num_years >=20;
```

(iii) What will be the output of the following query? Also, define the AVG() function. **[2]**
SELECT AVG(Num_years) FROM Dept WHERE Num_years <20;

OR (Option for part iii only)

What will be the output of the following query? Also, define the COUNT() function.
SELECT COUNT(Acsnno) FROM Dept WHERE Num_years <20 OR Num_years>18;

35. Sanyukta is the event incharge in a school. One of her students gave her a suggestion to use Python Pandas and Matplotlib for analysing and visualising the data, respectively. She has created a Data frame "SportsDay" to keep track of the number of First, Second and Third prizes won by different houses in various events.

	House	First	Second	Third
0	**Chenab**	5	7	6
1	**Ganges**	10	5	4
2	**Jamuna**	8	13	15
3	**Jhelum**	12	9	12
4	**Ravi**	5	11	10
5	**Satluj**	10	5	3

(i) Write command to display the house names where the number of Second Prizes are in the range of 12 to 20 **[1]**

(ii) Which command will give the output 24 **[1]**

(iii) Write command to Display all the records in the reverse order. Also, define this command **[2]**

OR (Option for part iii only)

Write command to Display the bottom 3 records. Also, define this command.

■■■

Self Assessment Paper-1

Informatics Practices

Class- XII [065]

UNSOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. Consider the following Series in Python:
data = pd.Series([5, 2, 3, 7], index = ['a', 'b', 'c', 'd'])
Which Statement will display all odd values?
(A) print(data%2==0) **(B)** print(data(data%2!=0)) **(C)** print(data mod 2!=0) **(D)** print(data[data%2!=0])
[1]

2. Consider the following series:
ser=pd.Series(['C', 'O', 'M', 'F', 'O', 'R', 'T', 'A', 'B', 'L', 'E'],
index= [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11])
print (ser[4:])

(A)	(B)	(C)	(D)
4 F	4 F	4 F	5 O
5 O	5 O	5 O	6 R
6 R	6 R	6 R	7 T
7 T	7 T	7 T	8 A
8 A	8 A	8 A	9 B
9 B	ditype: object	9 B	10 L
10 L		ditype: object	11 E
11 E			ditype: object
ditype: object			

[1]

3. Abhay is a student of class 'XII', and he is aware of some concepts of python. He has created the DataFrame, but he is getting errors after executing the code. Help him by identifying the correct statement that will create the DataFrame:

```
import pandas as pd
stuname=['Muskan', 'Radhika', 'Gopar', 'pihu']
term1=[70, 63, 74, 90]
term2=[67, 70, 86, 95]
```

(A) df=pd.DataFrame({"Name":stuname,"marks1":term1,"marks2":term2})
(B) df=pd.dataframe([stuname,terml,term2],columns=['stuName',"marks1","marks2"])
(C) df=pd.DataFrame({stuname,terml,term2})
(D) df=pd.dataframe({stuname,terml.term2}) **[1]**

4. What is the meaning of "HAVING" clause in Mysql?
(A) To filter out the row values **(B)** To filter out the column values
(C) To filter out the row and column values **(D)** None of the above **[1]**

5. "COUNT" keyword belongs to which categories in Mysql?
(A) Aggregate functions **(B)** Operators **(C)** Clauses **(D)** All of the mentioned **[1]**

6. The string function that returns the index of the first occurrence of substring is _____
(A) INSERT() **(B)** INSTR() **(C)** INSTRING() **(D)** INFSTR() **[1]**

7. Which amongst the following is not an example of browser ?
(A) Chrome **(B)** Firefox **(C)** Avast **(D)** Edge **[1]**

8. Which is called a smart HUB ?
(A) HUB with high speed ports **(B)** Switch
(C) Router **(D)** All of the Above **[1]**

9. Which of the following action can be taken to keep the digital footprint clean?
(A) Search what information you leftover social media and the internet
(B) Be smart and sensible while using any website, sending an email or opening a link
(C) Control visibility settings from the browser or website/app settings
(D) Remove any private details like mobile number, school, college name, address, photos, etc. **[1]**

10. Companies get their Trademark registered to protect?
(A) logos, names and brands **(B)** word, phrase, or symbol
(C) slogans, stylized fonts, and colors. **(D)** company furniture, worker, brands **[1]**

11. _____is the practice of taking someone else's work or ideas and passing them off as one's own: **[1]**
(A) Plagiarism **(B)** Copyright **(C)** Patent **(D)** All of the above

12. Saharsh is a student of class 9 and he is a very frequent user of internet applications. One day he got an unpleasant message on his instant messenger. What do you think he should do?
(A) Ignore it and start chatting to someone else.
(B) Reply back to them and find out what their problem is.
(C) Shut down the computer and hope they'll leave him alone in future.
(D) Go to his parents, teacher, or other trusted adult and let them know that he feels uncomfortable **[1]**

13. Who is responsible for the disposal of the product when it becomes e-waste?
(A) The sellers **(B)** The producers **(C)** The customers **(D)** The vendors **[1]**

14. Which clause is similar to "HAVING" clause in Mysql?
(A) SELECT **(B)** WHERE **(C)** FROM **(D)** None of the above **[1]**

15. Nested grouping can be done by providing _____ in the GROUP BY expression.
(A) SINGLE ROW **(B)** MULTIPLE FIELDS **(C)** SINGLE COLUMN **(D)** MULTIPLE TABLES **[1]**

16. The month() function in MySql is an example of .....…….. .
(A) Math function **(B)** Text function **(C)** Date Function **(D)** Aggregate Function **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).

(C) Assertion (A) is true but reason (R) is false.

(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** Browser is the software to access internet based webpages in the computer.
Reason (R): Local Area Network (LAN) is a network where two or more computers are connected within 1 km. **[1]**

18. **Assertion (A):** A histogram is an accurate representation of the distribution of numerical data.
Reason (R): Histogram is a kind of bar graph. **[1]**

Section - B

19. A say, "In this network topology, one malfunctioning node does not affect that rest of the network and it is easy to add and remove nodes.
B says, "In this network topology, cable length required is less but if the main cable encounters some problem, whole network breaks down.
Name the topologies A and B are talking about. **[2]**

OR

ABC bank has many computers connected in a building. What type of network is formed ? Name two hardware resources that can be shared by the computers connected in the bank network.

20. What is the use of SUBSTR( ) function ? **[2]**

21. Consider the following SQL string: "Organization"
Write commands to display:
(a) "zation"
(b) "gan" **[2]**

22. What do you mean by Matplotlib ? AI **[2]**

23. Explain active digital footprint. **[2]**

OR

Explain the term trademark. **[2]**

24. Give the output of the code

```
import pandas as pd
data = pd.DataFrame(['One','Two','Three','Four'],index = ['A', 'B', 'C','D'],
columns = ['Fixed'])
print(data)
```

AI **[2]**

25. Which type of graph is widely used in mathematics, especially in statistics? Explain. **[2]**

Section - C

26. Consider the following table Activity. Write SQL Commands for the statements (i) to (ii) and output for SQL queries (iii):

PID	PARTICIPANT	GRADE	EVENT	POINTS	EVENTDATE	HOUSE
101	Amit Dubey	A	Running	200	2018-12-19	Gandhi
102	Shivraj Singh	A	Hopping bag	300	2019-01-12	Bose
103	Raj Arora	B	Skipping	200	2018-12-19	Gandhi
104	Kapil Raj	A	Bean bag	250	2018-12-19	Bhagat
105	Deepshikha Sen	A	Obstacle	350	2018-03-31	Bose
106	Saloni Raj	B	Egg & Spoon	200	2018-12-20	Bose

(i) To display names of Participants and points in descending order of points.
(ii) To display House wise total points scored along with House name.
(i.e. display the HOUSE and total points scored by each HOUSE.)
(iii) SELECT AVERAGE (POINTS) FROM Activity WHERE HOUSE = 'Gandhi' or HOUSE = 'Bose'; **[3]**

27. Consider two objects A and B. A is a list where as B is a Series. Both have values 20, 35, 60, 90, 120.
What will be the output of the following two statements considering that the above objects have been created already?
(a) print (A*2)
(b) print(B*2)
Justify your answer. **[3]**

28. Below is given the velocity of a moving body at different instances of time. Draw the velocity time graph.

Time (s)	0	5	10	15	20	25	30
Velocity (ms^{-1})	10	15	20	20	30	15	0

29. How to apply netiquettes ? **[3]**

OR

List the types of plagiarism.

30. Write the Output of the following SQL queries : **[3]**

(i) SELECT RIGHT('Software', 2);

(ii) SELECT ROUND (79.987, 2);

(iii) SELECT POWER (7, 3);

OR

Considering the same string "Organization"
Write SQL commands to display:

(i) The position of the substring 'zat' in the given string

(ii) The last 3 letters of the string

(iii) The length of given string

Section - D

31. Define the POWER() function. Also explain its two examples. **[5]**

OR

Consider the tables given below :

Table : PARTICIPANT

ADMNO	NAME	HOUSE	ACTIVITY_CODE
6473	Kapil Shah	Gandhi	A105
7134	Joy Matthew	Bose	A101
8786	Saba Khan	Gandhi	A102
6477	Kapil Shah	Bose	A101
7658	Faizal Ahmed	Bhagat	A104

Table : ACTIVITY

ACTIVITY_CODE	ACTIVITY_NAME	POINTS
A101	Running	200
A102	Hopping bag	300
A103	Skipping	200
A104	Bean bag	250
A105	Obstacle	350

(i) To display Activity code along with number of participants participating in each activity (Activity Code Wise) from the table Participant.

(ii) To display names of Participants, Activity Code, Activity Name in alphabetic ascending order of names of participants.

(iii) To display Names of Participants along with Activity Codes and Activity Names for only those participants who are taking part in Activities that have 'bag' in their Activity Names and Points of activity are above 250.

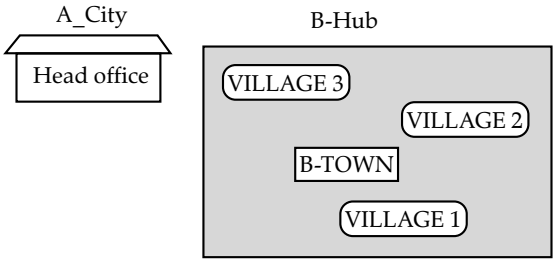
(iv) Identify data type and size to be used for column Activity code in table Activity.

(v) When the table "PARTICIPANT" was first created, the column 'NAME' was planned as the Primary key by the Programmer. Later a field ADMNO had to be set up as Primary key. Explain the reason .

32. Uplifting skills Hub India is a knowledge and skill community which has an aim to uplift the standard of knowledge and skills in the society. It is planning to setup its training centres in multiple towns and villages in India with its head offices in the nearest cities.

They have created a model of their network with a city, a town and 3 villages as follows.

As a network consultant, you have to suggest the best network related solutions for their issues problems raised in (i) to (iv) keeping in mind the distance between various locations and given parameters.



Shortest distance between various location :

VILLAGE 1 to B_TOWN	2 km
VILLAGE 2 to B_TOWN	1.0 km
VILLAGE 3 to B_TOWN	1.5 km
VILLAGE 1 to VILLAGE 2	3.5 km
VILLAGE 1 to VILLAGE 3	4.5 km
VILLAGE 2 to VILLAGE 3	2.5 km
A-CITY Head Office to B_HUB	25 km

Number of computers installed at various locations are as follows :

B_TOWN	120
VILLAGE 1	15
VILLAGE 2	10
VILLAGE 3	15
A_CITY Head OFFICE	6

Note:

- In villages, there are community centres, in which one room has been given as training centre to this organization to install computers.
- The organization gets financial support from the government and top IT companies.

(i) Suggest the most appropriate locations of the SERVER in the B_HUB out of the 4 locations, to get the best and effective connectivity. Justify you answer.

(ii) Suggest the best wired medium and draw the cable various locations within the B_HUB.

(iii) Which hardware device will you suggest to connect all the computers within each location of B_HUB?

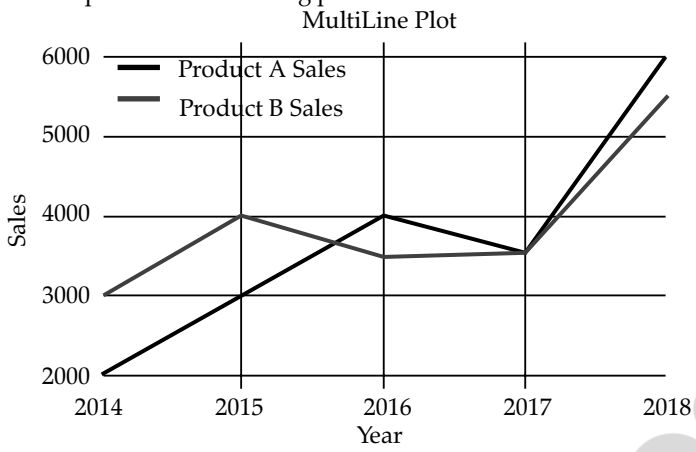
(iv) Which service/protocol will be most helpful to conduct live interactions of experts from Head office and people at all locations of B_HUB ?

(v) The organisation also has inquiry office in another dty about 50-60 km away in hilly region. Suggest the suitable transmission media to interconnect to school and inquiry office out of the following : i Fiber optic cable, i Microwave, i Radiowave **[5]**

33. Write a code for column deletion in DataFrame. **[5]**

OR

Write the code which will represent the following plot



Section - E

Case based Subjective Questions

34. A Gift Gallery has different stores in India. Database Administrator Abhay wants to maintain database of their Salesmen in SQL to store the data, He has decided that Name of the database: GiftGallery Name of the table: Salesman

Attributes of the tables: Scode – Numeric, Sname – Character 25, Address - Character 25, Dojoin - Date, Sales – Numeric and Area – Character 10

Consider the following records in 'Salesman' table and answer the given questions:

Scode	Sname	Address	Dojoin	Sales	Area
100	Amit	Delhi	2017/09/29	5000.90	East
101	Sushant	Gurgaon	2018/01/01	7000.75	East
102	Priya	Noida	2018/04/25	3450.45	West
103	Mohit	Delhi	2018/11/03	6000.50	North
104	Pryianshi	Delhi	2019/12/15	8000.62	North

(i) Help Priya to display sname and sales of east and west areas. **[1]**

(ii) The command to display the name of the salesman along with the sales amount rounded off to one decimal point. **[1]**

(iii) What will be the output of the following command? Also, define the round() function. **[2]**

Select Right (Sname,3), Round (Sales) from Salesman Where Sname Like "P%";

OR (Option for part iii only)

Identify the primary key of table Salesman. Also, explain primary key. **[2]**

35. Zeenat has created the following data frame dataframe1 to keep track of data Rollno, Name, Marks1 and Marks2 for various students of her class where row indexes are taken as the default values:

Roll No.	Name	Marks 1	Marks 2
1	Swapnil Sharma	30	50
2	Raj Batra	75	45
3	Bhoomi Singh	82	95
4	Jay Batra	90	95

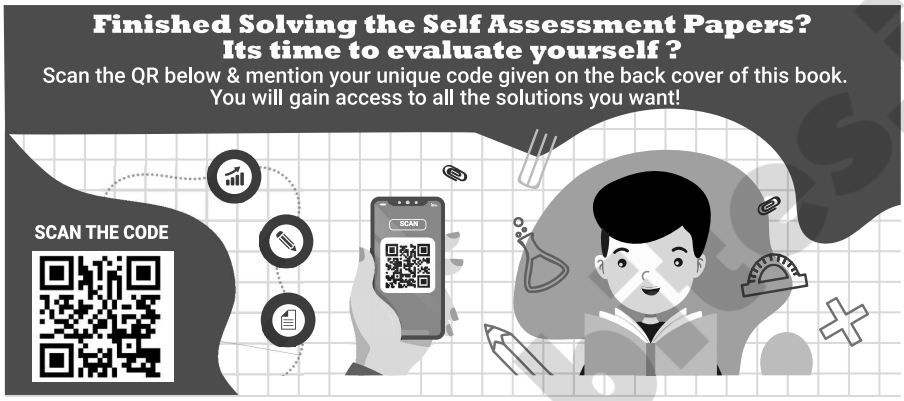
(a) **(i)** Which command will give 90, 95 as output. **[1]**

(ii) She wants to add a new column Marks3 with relevant data. Help her choose the command to perform this task. **[1]**

(b) Write the command to delete the 3rd column using del keyword. Also, define the del keyword. **[2]**

OR (Option for part iii only)

Which command will display the total number of elements in the dataframe? Also, define the size attribute.



Self Assessment Paper-2

Informatics Practices

Class- XII [065]

UNSOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. What will be the output of the following code?

```
import pandas as pd
import numpy
s=pd.Series (data=[31, 54, 34, 89, 12, 23],
dtype=numpy.int)
print (s>50)
```

(A)	**(B)**	**(C)**	**(D)**
0 False	1 54	0 31	1 True
1 True	3 89	1 54	3 true
2 False	dtype:int64	2 34	dtype:bool
3 True		3 89	
4 False		4 12	
5 False		5 23	
ditype:bool		dtype:int64	

[1]

2. Mr. Raman created a DataFrame from a Numpy array:

```
arr = np.array ([[2, 4, 8, ], [3, 9, 27], [4, 16, 64]])
df=pd.DataFrame (arr,index = ['one','two',three'],_____)
print(df)
```

Help him to add a customized column labels to the above DataFrame-

(A) columns='no','sq','cube' **(B)** column=['no,'sq',cube']
(C) columns=['no','sq','cube'] **(D)** columns=[['no', 'sq', 'cube']] **[1]**

3. PyPlot is an interface of Python's ---------- library.
(A) seaborn **(B)** plotly **(C)** ggplot **(D)** matplotlib **[1]**

4. Write the output of the following SQL command:
SELECT left("Jammu Region", 5);
(A) Region **(B)** Jammu **(C)** Jammu Region **(D)** None of the above. **[1]**

5. Write the output of the following SQL command:
select round(458.45, - 1);
(A) 450 **(B)** 460 **(C)** 458 **(D)** 500 **[1]**

6. Computer Network is:
(A) Collection of hardware components and computers.
(B) Interconnected by communication channels.
(C) Sharing of resources and information.
(D) All of the Above **[1]**

7. Which device is used to transfer Communication Signal to Long Directions ?
(A) Amplifier **(B)** Repeater **(C)** Router **(D)** All of the Above **[1]**

8. Data protection refers to protecting data from:
(A) Substantial Harm **(B)** Embarrassment
(C) Inconvenience and unfairness **(D)** All of these **[1]**

9. Typing in all capitals in electronic communications means:
(A) This message is very important. **(B)** You are shouting.
(C) It's okay to forward this message to others. **(D)** Nothing special--typing in all caps is normal. **[1]**

10. Write the output of the following SQL command.
select substr("Oswaal",3,4);
(A) waa **(B)** waal **(C)** swaa **(D)** swaal **[1]**

11. Hackers usually used the computer virus for _____ purpose.
(A) To log, monitor each and every user's stroke
(B) To gain access of the sensitive information like user's Id and Passwords
(C) To corrupt the user's data stored in the computer system
(D) All of the above **[1]**

12. Which of the following is not a type of cybercrime?
(A) Data theft **(B)** Forgery
(C) Damage to data **(D)** Installing antivirus for protection **[1]**

13. There is only 1 day left for Ravisha to submit her Science project. Therefore she performed the following activities. Which of these can be considered as plagiarism?
(A) Downloaded the images that were marked as CC and pasted in her project file.
(B) Copied the content from some website and pasted in her file.
(C) Copied the content from the website and gave reference about the same in the project.
(D) Downloaded and installed the open source software for typing the synopsis. **[1]**

14. SELECT MOD(15, 3); will produce the output as:
(A) 0 **(B)** 1 **(C)** 5 **(D)** Error **[1]**

15. SELECT INSTR('Language','gua'); will produce the output:
(A) 4 **(B)** 3 **(C)** 5 **(D)** -4 **[1]**

16. Which of the following option is correct output for below statement?
SELECT LEFT ('Water Park', 4);
(A) Water **(B)** Park **(C)** Wate **(D)** Wate Park **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** URL stands for Uniform Run Line.
Reason (R): The First Page we generally view when we open the browser is called home page. **[1]**

18. **Assertion (A):** A dict can be passed as an input to the Series.
Reason (R): If index is passed, then corresponding values to a particular label in the index will be extracted from the dictionary. **[1]**

Section - B

19. When is a repeater used in a computer network? **[2]**

OR

Why switch is called an intelligent hub?

20. Write the name of functions which:
(i) returns length of a string.
(ii) returns specified number of characters from a string. **[2]**

21. Riya is using a table Employee.
It has the following columns:
Code, Name, Fees, Course
She wants to display minimum fees Departmentwise. She wrote the following statement:
SELECT Code, MIN(Fees) FROM College;
But she did not get the desired result. Rewrite the above query with necessary changes to help her get the desired result. **[2]**

22. Define the following terms:
(i) .loc[]
(ii) .iloc[] **[2]**

23. List the types of IPR. **[2]**

OR

What is hacking? **[2]**

24. Write the output of following code:

```
import pandas as pd
data = ['a', 'b', 'c', 'd', 'e']
df = pd.DataFrame(data)
print(df)
```

[2]

25. Give the output:

```
import pandas as pd
data = [['Kiyaan', 15], ['Kasish', 22], ['Aadi', 23]]
df1 = pd.Dataframe (data, columns = ['Name','Age'])
print(df1)
```

[2]

Section - C

26. Write the output of the SQL statements for the following table :

Table : Book

Book_Id	Book_Name	Author_Name	Publisher	Price	Type	Quantity
C0001	Fast Cook	Lata Kapoor	Oswaal	355	Cookery	5
F0001	The Tears	Villiam Hopkins	Fist Publ.	650	Fiction	20
T0001	My First C++	Brain & Brooke	Oswaal	350	Text	10
T0002	C++Brain Work	A.W. Rossiane	TDH	350	Text	15
F0002	Thunderbolts	Anna Roberts	Fist Publ.	750	Fiction	50

(i) SELECT COUNT(*) FROM Book;
(ii) SELECT MAX(Price) FROM Book WHERE Quantity >= 15;
(iii) SELECT COUNT(DISTINCT Publisher) FROM Book WHERE Price >= 400; **[3]**

27. Consider two objects X and Y. X is a list where as Y is a Series. Both have values 20, 40, 55, 95, 125.
What will be the output of the following two statements considering that the above objects have been created already?

(a) print (X*2) **(b)** print(Y*2)

Justify your answer. **[3]**

28. Create an array in the range 5 to 50 with values 0•5 apart. Create another array with values of log of first array. Plot a graph of first vs second array, specify the x-axis title as 'Random values' and y-axis title as 'log values'. Plot the graph with dash dotted lines. **[3]**

29. What are the effects of cyber bullying and trolling? **[3]**

OR

Define the e-mail Etiquettes.

30. Write the output of the following SQL queries:

(i) SELECT MID('Examination', 4, 3);
(ii) SELECT INSTR('INFORMATION', 'FOR');
(iii) SELECT LENGTH ('Examination'); **[3]**

OR

Consider the following SQL string: "Commission"
Write commands to display:

(i) "mission" **(ii)** "mis" **(iii)** 10

Section - D

31. Give the output for the following queries (i) to (iv) based on table GARMENT:

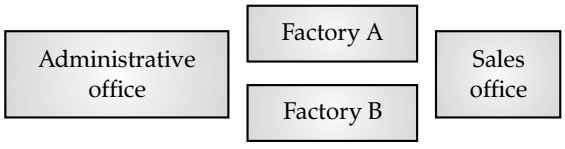
GCODE	GNAME	SIZE	COLOUR	PRICE
111	TShirt	XL	Red	1400.00
112	Jeans	L	Blue	1600.00
113	Skirt	M	Black	1100.00
114	Ladies Jacket	XL	Blue	4000.00
115	Trousers	L	Brown	1500.00
116	Ladies Top	L	Pink	1200.00

(i) SELECT COUNT(DISTINCT SIZE) FROM GARMENT;
(ii) SELECT AVG (PRICE) FROM GARMENT;
(iii) SELECT GNAME, COLOUR FROM GARMENT WHERE SIZE = 'M' ;
(iv) SELECT GNAME, COLOUR FROM GARMENT WHERE PRICE > = 3000;
(v) What is the primary key of the table GARMENT? **[5]**

OR

Which function is used to return the remainder of one expression by dividing it to another expression? Explain with example.

32. Inshika Industries has set up its new production unit and sales office at Ranchi. The company compound has 4 buildings as shown in the diagram given : **[5]**



Distances between these buildings are as follows:

Administrative office to Factory A	150 mt
Factory A to Factory B	50 mt
Factory B to Sales office	100 mt

Sales office to Administrative office	200 mt
Administrative office to Factory B	125 mt

Number of computers in each of the buildings are:

Administrative office	15
Factory A	25
Factory B	18
Sales office	15

(i) Suggest a cable layout of connections between the buildings so that each building is directly connected to Administrative office.

(ii) Suggest the most suitable place (i.e. building) to house the server of this production unit with a suitable reason.

(iii) Suggest the placement of the following devices with justification :
- **(a)** Repeater
- **(B)** Hub/Switch

(iv) The administrative office of this unit is to be linked with the head office situated in Patiala (Punjab). What will be the most economical way to do this? Justify you answer.

(v) Which type of network out of the following is formed by connecting the computers of these buildings?
- LAN
- MAN
- WAN

33. How can you create a DataFrame structure from a dictionary of lists? **[5]**

OR

What is the Series and how is it different from a 1-D array, a list and a dictionary?

Section - E

Case based Subjective Questions

34. Consider the below mentioned table 'CLOTH':

DECODE	DESCRIPTION	PRICE	MCODE	LAUNCHDATE
10001	Formal Shirt	1250	M001	12-Jan-08
10020	Frock	760	M004	90-Sep-07
10012	Informal Shirt	1450	M002	16-Jun-08
10019	Evening Gown	850	M003	06-Jun-08
10090	Tulip Skirt	860	M002	31-Mar-07
10023	Pencil Skirt	1250	M003	19-Dec-08
10089	Slacks	860	M003	20-Oct-08

Write the commands for (i) and (ii) and output for (iii) -

(i) Display first three letters of description e.g. 'FRO' for 'FROCK'. **[1]**

(ii) Display the description after removing leading spaces if any. **[1]**

(iii) SELECT COUNT(DISTINCT MCODE) FROM CLOTH; **[2]**

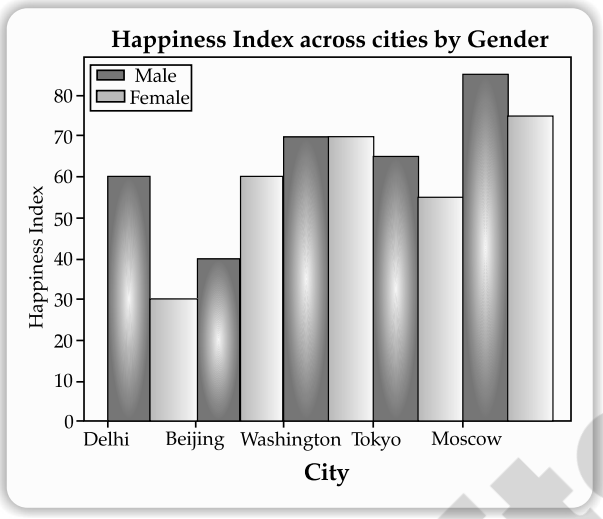
OR (Option for part iii only)

SELECT MAX(LAUNCHDATE) FROM CLOTH;

35. Gaurav has written a Python Code to create a bar plot as given below using the following data:

City	Happiness_ Index Male	Happiness_ Index Female
Delhi	60	30
Beijing	40	60

Washington	70	70
Tokyo	65	55
Moscow	85	75



import as _____ #Statement 1
City=['Delhi','Beijing','Washington','Tokyo', 'Moscow']
Gender=['Male','Female']
Happiness_Index_Male=[60,40,70,65,85]
Happiness_Index_Female=[30,60,70,55,75]
plt.bar([0.25,1.25,2.25,3.25,4.25],Happiness_Index_Male,color='blue',label="Male",width=.5)
plt._____ ([.75,1.75,2.75,3.75,4.75],Happiness_Index_Female,color='Green',width=.5,label="Female") #Statement 2
pos=range(len(City)) print(pos)
plt.xticks(pos,City,fontsize=10) plt.xlabel('City', fontsize=16)
plt.ylabel('Happiness_Index', fontsize=16)
_____ #Statement 3
_____ #Statement 4

_____ #Statement 5

(a) **(i)** Identify the suitable code to be used in the blank space in line marked as Statement 1. **[1]**

(ii) What is the name of the function to plot the required bar graph in the line marked as Statement 2 **[1]**

(b) Fill in the blank in statement 3 to set Chart Title as "Happiness Index across cities by gender "on font size as 18. Also, define the title() method. **[2]**

OR (Option for part iii only)

Fill in the blank marked in Statement 5 to display the plot. Also, define this method.

■■■

Self Assessment Paper-3

Informatics Practices

Class- XII [065]

UNSOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. Pandas key data structure is called:
(A) Keyframe **(B)** DataFrame **(C)** Statistics **(D)** Econometrics **[1]**

2. Which command will be used to delete 3 and 5 rows of the data frame, assuming the data frame name as DF.
(A) DF.drop([2,4],axis=0) **(B)** DF.drop([2,4],axis=1) **(C)** DF.drop([3,5],axis=1) **(D)** DF.drop([3,5]) **[1]**

3. Which object do you get after reading a CSV file using pandas.read_csv()?
(A) Dataframe **(B)** Nd array **(C)** Char Vector **(D)** None **[1]**

4. The now()function in MySql is an example of……..
(A) Math function **(B)** Text function **(C)** Date Function **(D)** Aggregate Function **[1]**

5. Which of the following is not a built in aggregate function in SQL?
(A) avg **(B)** max **(C)** total **(D)** count **[1]**

6. Which of the following aggregation operation adds up all the values of the attribute?
(A) add **(B)** avg **(C)** max **(D)** sum **[1]**

7. What is an standalone computer system ?
(A) It is a computer system with internet connectivity **(B)** It is a server
(C) It is a computer without any networking **(D)** None is correct **[1]**

8. A collection of hyperlinked documents on the internet forms the
(A) World Wide Web (WWW) **(B)** E-mail system
(C) Mailing list **(D)** Hypertext markup language **[1]**

9. After practicals, Atharv left the computer laboratory but forgot to sign off from his email account. Later, his classmate Revaansh started using the same computer. He is now logged in as Atharv. He sends inflammatory email messages too few of his classmates using Atharvs email account. Revaansh activity is an example of which of the following cybercrime? Justify your answer.
(A) Hacking **(B)** Identity theft **(C)** Cyber bullying **(D)** Plagiarism **[1]**

10. A is someone who breaks into someone else's computer system, often on a network; bypasses passwords or licenses in computer programs without malicious intent with a wish to learn and improve security.
(A) hacker **(B)** cracker
(C) worm **(D)** malware **[1]**

11. The following can be patented
(A) Machine **(B)** Process
(C) Composition of matter **(D)** All of the above **[1]**

12. Abhilasha forgot to sign out from her gmail id and Aditi used Abhilasha's gmail to sent mail. This act of Aditi is considered as:
(A) Plagiarism **(B)** Identity Theft **(C)** Phishing **(D)** Piracy **[1]**

13. In which year India's IT Act came into existence ?
(A) 2000 **(B)** 2001 **(C)** 2002 **(D)** 2003 **[1]**

14. SELECT MOD(12, 5); will produce the output as:
(A) 2 **(B)** 4 **(C)** 0 **(D)** 5 **[1]**

15. SELECT LEFT ('Program', 4); Output will be:
(A) gram **(B)** Prog **(C)** rogr **(D)** Pro **[1]**

16. SELECT INSTR('Python Program', 'thon'); will produce the output:
(A) 3 **(B)** 4 **(C)** -2 **(D)** 2 **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true.

17. **Assertion (A):** VoIP stands for Voice over Internet Protocol.
Reason (R): It is a technology that allows you to make voice calls using a broadband internet connection instead of a regular phone line. **[1]**

18. **Assertion (A):** In Python Pandas, Series.index attribute is used to get or set the index labels of the given series object.
Reason (R): ix[] attribute is used to access a group of rows and columns by label (s) or a boolean array in the given series object. **[1]**

Section - B

19. What are the advantages of computer network? **[2]**

OR

(i) I:
- am a small text file
- created on a user's computer
- contain small pieces of data — like a username, password and user's browsing history as well as preferences
- may help to improve user's web browsing experience. Who am I?

(ii) Name any two popular web browsers.

20. What is the difference between HAVING and WHERE clauses? **[2]**

21. Consider the following SQL string: "Connection"
Write commands to display:
(a) "tion"
(b) "nec" **[2]**

22. Write a Python code to create dataframe with appropriate headings from the list given below :
['S101', 'Amy', 70]
['S102', 'Bandhi', 69]

['S104', 'Cathy', 75]
['S105', 'Gundoho', 82] **[2]**

23. What are digital rights? **[2]**

OR

Write the rules to follow for good netiquette. **[3]**

24. Give the output of the following code:

```
import pandas as pd
data = ['One', 'Two', 'Three', 'Four','Five']
df = pd.DataFrame(data)
print(df)
```

[2]

25. How Pyplot is related to Matplotlib? **[2]**

Section - C

26. Consider the table 'Teacher' given below

Teacher_Id	Department	Periods
T101	Science	32
T102	Null	30
T103	Mathematics	34

What will be the output of the following queries on the basis of the above table?

(i) Select count(Department) from Teacher;
(ii) Select count(*) from Teacher;
(iii) Select Department from Teacher order by Periods; **[3]**

27. Consider two objects X and Y. X is a list where as Y is a Series. Both have values 15, 20, 40, 65, 90.
What will be the output of the following two statements considering that the above objects have been created already?

(a) print (X*3)
(b) print(Y*3)

Justify your answer. **[3]**

28. What is the output of the following code?

```
SpotCrudePrices_2013_Data = {
'U.K. Brent' : {'2013-Q1': 112.9, '2013-Q2':103.0, '2013-Q3' : 110.1, '2013-Q4' :
109.4},
'Dubai' : {'2013-Q1': 108·1, '2013-Q2': 100.8, '2013-Q3': 106.1, '2013-Q4': 106.7},
'West Taxes Intermediate' : {'2013-Q1' : 94.4, '2013-Q2' : 94.2, '2013-Q3' : 105.8,
'2013-Q4' : 97.4}}
```

29. Explain IPR. **[3]**

OR

What is IT Act 2000?

30. Write the output of the following SQL queries: **[3]**

(i) SELECT MID('Communication', 4, 3);
(ii) SELECT INSTR('PROGRAM', 'ROG');
(iii) SELECT RIGHT('Communication', 4);

OR

Considering the same string "Connection"
Write SQL commands to display:

(i) the position of the substring 'nec' in the string
(ii) the last 3 letters of the string
(iii) the length of the string

Section - D

31. Which function converts all the letters in a string into uppercase? Explain with example. **[5]**

OR

Consider the following tables Product and Client. Write SQL commands for the statements (i) to (iii) and give outputs for SQL queries (iv) to (v).

Table : PRODUCT

P_ID	Product Name	Manufacturer	Price
TP01	Talcum Powder	LAK	40
FW05	Face Wash	ABC	45
BS01	Bath Soap	ABC	55
SH06	Shampoo	XYZ	120
FW12	Face Wash	XYZ	95

Table : CLIENT

C_ID	Client Name	City	P_ID
01	Cosmetic Shop	Delhi	FW05
06	Total Health	Mumbai	BS01
12	Live Life	Delhi	SH06
15	Pretty Woman	Delhi	FW12
16	Dreams	Bengaluru	TP01

Write SQL command

(i) To display the details of those Clients whose city is Delhi.

(ii) To display the details of Products whose Price is in the range of 50 to 100 (both values included).

(iii) To display the details of those products whose name ends with 'Wash'

Give output of

(iv) Select distinct City from CLIENT;

(v) Select Manufacturer, max(Price), min(Price), count(*) from PRODUCT group by Manufacturer;

32. ABC Pvt Ltd. is setting up the network in the Bengaluru. There are four departments named as market, Finance, Legal and Sales. **[5]**

Distance between various buildings is as follows :

Market to Finance	80 mt
Market to Legal	180 mt
Market to Sales	100 mt
Legal to Sakes	150 mt
Legal to Finance	100 mt
Finance to Sales	50 ml

Number of computers in the building:

Market	20
Legal	10
Finance	08
Sales	42

(i) Suggest a cable layout of connections between the departments and specify the topology.

(ii) Suggest the most suitable building to place the server by giving suitable reason.

(iii) Suggest the placement of (i) modem (ii) hub/switch in the network.

(iv) The organization is planning to link its sale counter situated in various part of the same city. Which type of network out of LAN, WAN, MAN will be formed? Justify.

(v) The organisation also has inquiry office in another city about 50-60 km away in hilly region. Suggest the suitable transmission media to interconnect to its Market department and inquiry office out of the following : Fiber optic cable, Microwave, Radiowave

33. Write code to create Dataframe with following data. **[5]**

	Colour	Count	Price
Apple	Red	3	120
Apple	Green	9	110
Pear	Red	25	125
Pear	Green	26	150
Lime	Red	99	70

Now :

(i) Find all rows with the label 'Apple'. Extract all columns.

(ii) List only rows with label 'Apple' and 'Pear' using loc.

OR

How can you add columns to a DataFrame?

Section - E

Case based Subjective Questions

34. Consider the following table 'Furniture'. Write output for (i) and (ii) and SQL command for (iii)

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) SELECT SUM (PRICE) FROM Furniture WHERE WCODE='W03'; **[1]**

(ii) SELECT COUNT (DISTINCT PRICE) FROM Furniture; **[1]**

(iii) To display FCODE and NAME of each Furniture Item in descending order of FCODE. **[2]**

OR

To display WCODE wise, WCODE and the highest price of Furniture Items

35. Ms Ramdeep Kaur maintains the records of all students of her class. She wants to perform some operations on the data:

Code:

```
import pandas as pd
t= {'Rollno': [101, 102, 103, 104, 105, 106, 107],
 'Name': ['Shubrato', 'Krishna', 'Pranshu',
 'Gurpreet', 'Arpit', 'Sanidhya', 'Aurobindo'],
 'Age': [15, 14, 14, 15, 16, 15, 16],
'Marks': [77.9, 70.4, 60.9, 80.3, 86.576, 67.7, 85.0],
 'Grade': ['11B', '11A', '11B', '11C', '11E', '11A',  '11C', ]}
 df = pd.DataFrame (t,index=[10, 20, 30, 40, 50, 60, 70])
 print (df)
```

	Rollno	Name	Age	Marks	Grade
10	101	Shubrato	15	77.9	11B
20	102	Krishna	14	70.4	11A
30	103	Pranshu	14	60.9	11B

40	104	Gurpreet	15	80.3	11C
50	105	Arpirt	16	86.5	11E
60	106	Sanidhya	15	67.7	11A
70	107	Aurobindo	16	85.0	11C

(a) **(i)** The correct statement for the below output: **[1]**

```
Name      Krishna
Age       14
Marks     70.4
Grade     11A
Name: 20, dtype: object
```

(i) The teacher wants to know the marks secured by the second last student only, Which statement would help her to get the correct answer? **[1]**

(b) Which statement will add a new column 'fee' at second position with values [3200, 3400, 4500, 3100, 3200, 4000, 3700] in Data frame df? **[2]**

OR (Option for part iii only)

Which command would rename the column 'Marks' to 'Halfyearly' in the DataFrame df?

■■■

Self Assessment Paper-4

Informatics Practices

Class- XII [065]

UNSOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. What will be the output of the given code?
```
import pandas as pd
s = pd.Series([1,2,3,4,5], index=['akram','brijesh','charu','deepika','era'])
print(s['charu'])
```
(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **[1]**

2. A social science teacher wants to use a pandas series to teach about Indian historical monuments and its states. The series should have the monument names as values and state names as indexes which are stored in the given lists, as shown in the code.
Choose the statement which will create the series:
```
import pandas as pd
Monument=['Qutub Minar','Gateway of India', 'Red Fort','Taj Mahal']
State=['Delhi','Maharashtra','Delhi','Uttar Pradesh']
```
(A) S=df.Series(Monument,index=State) **(B)** S=pd.Series(State,Monument)
(C) S=pd.Series(Monument,index=State) **(D)** S=pd.series(Monument,index=State) **[1]**

3. Out of the following, which function cannot be used for customization of charts in Python?
(A) xlabel() **(B)** colour()
(C) title() **(D)** xticks() **[1]**

4. What is the result of the following:
```
SELECT MOD (57, 5);
```
(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **[1]**

5. ROUND( ) function rounds up the number to the upward or downward whichever the _____ whole number.
(A) Nearest **(B)** Zero **(C)** None **(D)** None of these **[1]**

6. Write the output of the following SQL query:
SELECT POW (INSTR('Comment','e'),2);
(A) 16 **(B)** 5 **(C)** 4 **(D)** 25 **[1]**

7. HTML is used to create:
(A) machine language program **(B)** high level program
(C) web page **(D)** web server **[1]**

8. Web site's front page /main page is called:
(A) Browser Page **(B)** Search Page
(C) Home Page **(D)** Bookmark **[1]**

9. Knowledge and understanding of netiquette is useful because:
(A) it will help you create a positive impression on those you meet in cyberspace.
(B) it explains some of the technical limitations of online communications.
(C) it explains the conventions already being used by millions of cybernauts.
(D) all of the above. **[1]**

10. Include a subject line:
(A) only when you are writing an official memo. **(B)** only in personal memos.
(C) if the person you are sending it to requires one. **(D)** in all e-mail messages. **[1]**

11. The data taken from a digital footprint can be used for:
(A) Hacking **(B)** Only for feedback **(C)** Showing relevant ads **(D)** All of these **[1]**

12. We should exhibit proper manners and etiquettes while being online. Choose the right net etiquette(s) from the following:
(A) Avoid Cyber Bullying **(B)** Respect Other's Privacy
(C) No Copyright violation **(D)** All of the above **[1]**

13. Rishika found a crumpled paper under her desk. She picked it up and opened it. It contained some text which was struck off thrice. But she could still figure out easily that the struck off text was the emailID and password of Garvit, her classmate. What is ethically correct for Rishika to do?
(A) Inform Garvit so that he may change his password.
(B) Give the password of Garvit's email ID to all other classmates.
(C) Use Garvit's password to access his account.
(D) None of these **[1]**

14. Find the output of:
SELECT RIGHT ('Mrs Universe', 2);
(A) se **(B)** rs **(C)** rs se **(D)** Error **[1]**

15. Which of the following option is correct output for below statement?
SELECT LEFT ('Mr Hello', 4);
(A) Mr **(B)** Mr H **(C)** Mr He **(D)** None **[1]**

16. If column "Present" contains the data set (15,18,17,15,18), what will be the output after the execution of the given query?
SELECT MAX (DISTINCT Present) FROM Data;
(A) 17 **(B)** 18 **(C)** 15 **(D)** Error **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** The repeater is a device that amplifies the network over geographical distance.
Reason (R): A hub is a device which is used to connect more than one device in the network. **[1]**

18. **Assertion (A):** To make a Histogram with Matplotlib, we can use the plt.hist() function.
Reason (R): The bin parameter is compulsory to create histogram. **[1]**

Section - B

19. Draw a network layout of bus topology to connect 5 client computers and one server computer. **[2]**

OR

Sahil, a Class X student, has just started understanding the basics of Internet and web technologies. He is a bit confused in between the terms "World Wide Web" and "Internet". Help him in understanding both the terms with the help of suitable examples of each

20. Define the following terms

(i) POWER( )

(ii) ROUND( ) **[2]**

21. Can a GROUP BY clause be used for more than one column? Give example. **[2]**

22. Write a program that reads from a CSV file where the separator character is '$'. Read only the first 5 rows in your dataframe. Give column headings as ItemName, Quantity, Price. Make sure to read the first row as data and not as column headers **[2]**

23. What is the purpose of data protection?

OR

Define open source.

24. What do you mean by bar graph? **[2]**

25. Write a Python code to create dataframe with appropriate headings from the list given below :

	ID	Name	Scores
0	C01	Rishi	170
1	C02	Keshav	169
2	C03	Chetan	175
3	C04	Tushar	182
4	C05	Aadi	167

[2]

Section - C

26. Given 'Employee' table as follows :

Employee_Id	Category	Salary
101	Sabhyata Sharma	Null
102	Divya Arora	8900
103	Faizal Zaidi	Null

What values will the following statements return? **[3]**

(i) SELECT COUNT(*) FROM Employee;

(ii) SELECT COUNT(Salary) FROM Employee;

(iii) SELECT Name FROM Employee WHERE Employee_ID = 102;

27. Consider two objects A and B. A is a list where as B is a Series. Both have values 25, 60, 80.

What will be the output of the following two statements considering that the above objects have been created already?

(a) print (A*2)

(b) print(B*2)

Justify your answer. **[3]**

28. What is boolean indexing ? Also write four ways to filter a data in boolean indexing. **[3]**

29. Write the objectives of IPR. **[3]**

OR

What are the advantages of digital footprint?

30. Write the output of the following SQL queries :

(i) SELECT MID('Healthy Diet', 5, 3);

(ii) SELECT RIGHT (CONCAT('PYTHON','PROGRAM'),4);

(iii) SELECT LENGTH ('PYTHON PROGRAM');

OR

Consider the following SQL string: "Arguments"

Write commands to display:

(i) "ments"

(ii) "men"

(iii) Argu **[3]**

Section - D

31. Which function converts all the characters in a string into lowercase? Explain with example.

OR

Consider a Table LOANS:

AccNo	Cust_Name	Amount	Installments	Int_Rate	Start_Date	Interest
1.	R.K. Gupta	300000	36	12.00	19-07-2009	1200
2.	S.P. Sharma	500000	48	10.00	22-03-2008	1800
3.	K.P. jain	300000	36	Null	08-03-2009	1600
4.	M.P. Yadav	800000	60	10.00	06-12-2008	2250
5.	S.P. Sinha	200000	36	12.50	03-01-2010	4500
6.	P. Sharma	700000	60	12.5	05-06-2008	3500
7.	K.S. Dhall	500000	48	Null	05-03-2008	3800

Answer the following questions.

(i) Display the sum of all Loan Amounts whose Interest rate is greater than 10.

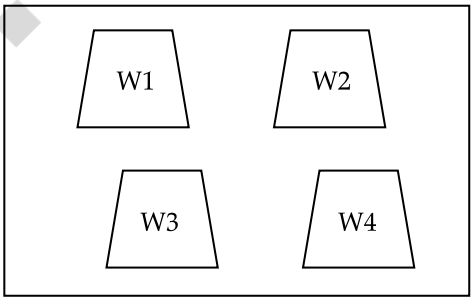
(ii) Display the Maximum Interest from Loans table.

(iii) Display the count of all loan holders whose name ends with 'Sharma'.

(iv) Display the count of all loan holders whose Interest is Null.

(v) Display the Interest-wise details of Loan Account Holders. **[5]**

32. A company in Mega Enterprises has 4 wings of buildings as shown in the diagram :



Centre to centre distances between various Buildings:

W3 to W1	50m
W1 to W2	60m
W2 to W4	25m
W4 to W3	170m
W3 to W2	125m
W1 to W4	90m

Number of computers in each of the wing:

W1	150
W2	15
W3	15
W4	25

Computers in each wing are networked but wings are not networked. The company has now decided to connect the wings also.

(i) Suggest a most suitable cable layout for the above connections.

(ii) Suggest the most appropriate topology of the connection between the wings.

(iii) The company wants internet accessibility in all the wings. Suggest a suitable technology .

(iv) Suggest the placement of the following devices with justification if the company wants minimized network traffic :

(a) Repeater

(b) Hub / switch

(v) The company is planning to link its head office situated in New Delhi with the offices in hilly areas. Suggest a way to connect it economically. **[5]**

33. Write code on row selection by label in Data Frames. **[5]**

OR

Write a Python program to plot two or more lines

Section - E

Case based Subjective Questions

34. Consider the following table Activity. Write output for the commands (i) to (ii) and command for the statement (iii):

PID	PARTICIPANT	GRADE	EVENT	POINTS	EVENTDATE	HOUSE
101	Amit Dubey	A	Running	200	2018-12-19	Gandhi
102	Shivraj Singh	B	Hopping bag	300	2019-01-12	Bose
103	Raj Arora	B	Skipping	200	2018-12-19	Gandhi
104	Kapil Raj	A	Bean bag	250	2018-12-19	Bhagat
105	Deepshikha Sen	A	Obstacle	350	2018-03-31	Bose
106	Saloni Raj		Egg & Spoon	200	2018-12-20	Bose

(i) SELECT COUNT (DISTINCT POINTS) FROM ACTIVITY ; **[1]**

(ii) SELECT SUM(POINTS) FROM ACTIVITY; **[1]**

(iii) To display names of Participants and points in descending order of points. **[2]**

OR (Option for part iii only)

To display House wise total points scored along with House name. (i.e. display the HOUSE and total points scored by each HOUSE.) **[2]**

35. A Shivalik restaurant has recorded the following data into their register for their income by Drinks and Food

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Drinks	450	560	400	605	580
Food	490	600	425	610	625

A software designer is trying to write a code to plot the graph. Help him to fill in the blanks of the code and get the desired output.

```
import matplotlib.pyplot as pp
day =['Monday','Tuesday','Wednesday','Thursday','Friday']
```

```
dr = [450,560,400,605,580]
fd = [490,600,425,610,625]
pp.plot(day,dr,label='Drinks',_______= 'g')          Line-1
pp.plot(day,fd,label='Food',_______='m')             Line-2
pp._____                                             Line-3
pp.xlabel("Days")
pp._____ ("Orders")                                  Line-4
pp._____                                             Line-5
pp._____                                             Line-6
```

(a) **(i)** Choose the correct function from the following option for the Line-4. **[1]**

(ii) Choose the right function/method from the following for the Line-6. **[1]**

(b) Identify the suitable code to be used in the blank space in line marked as Line-3 to write a title for the chart "The Weekly Restaurant Orders". **[2]**

OR (Option for part iii only)

What is the name of the function to Display legends in line marked as Line-5? Also, define it.

■■■

Self Assessment Paper-5

Informatics Practices

Class- XII [065]

UNSOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) This question paper contains five sections, Section A to E.
(ii) All questions are compulsory.
(iii) Section A have 18 questions carrying 01 mark each.
(iv) Section B has 07 Very Short Answer type questions carrying 02 marks each.
(v) Section C has 05 Short Answer type questions carrying 03 marks each.
(vi) Section D has 03 Long Answer type questions carrying 05 marks each.
(vii) Section E has 02 questions carrying 04 marks each. One internal choice is given in Q35 against part c only.
(viii) All programming questions are to be answered using Python Language only.

Section - A

Multiple Choice Questions

1. Series data is _____ but the size of Series data is _____.

(A) Immutable, mutable **(B)** Mutable, immutable
(C) Mutable, mutable **(D)** Immutable, immutable **[1]**

2. Consider the following data frame name df:

	Name	Agg	Marks
0	Amit	15	90.0
1	Bhavdeep	16	NaN
2	Reema	17	87.0

Write the output of the given command:
print(df.marks/2)

(A)
0 45.0
1 NaN
2 43.5
Name: Marks,dtype: float64

(B)
0 45.0
1 NaN
2 43
name: Marks, dtype:float64

(C)
0 45
1 NaN
2 43.5
Name: Marks,dtype:float64

(D)
0 45.0
1 0
2 43.5
name: Marks, dtype:float64 **[1]**

3. Which function is used to create a histogram ?

(A) histogram( ) **(B)** histo( )
(C) hist() **(D)** histtype **[1]**

4. An online discussion group that allows direct live communication is known as:

(A) e-Mail **(B)** Hyperlink
(C) Chat group **(D)** Webcrawler **[1]**

5. When sending an Email, the ___ line describes the contents of the message.
(A) to **(B)** cc **(C)** subject **(D)** contents **[1]**

6. Himanshi sets up her own company to sell her own range of clothes on Instagram. What type of intellectual property can she use to show that the clothes are made by her company?
(A) Patents **(B)** Copyright **(C)** Design **(D)** Trademark **[1]**

7. A contract between the creator and the user to allow the user use his/her work with some price is:
(A) Agreement **(B)** Copyright **(C)** License **(D)** Patent **[1]**

8. Write the output of the following SQL command:
SELECT LEFT("Python Computer", 5);
(A) Python **(B)** Pytho
(C) Pytho Compu **(D)** None of the above. **[1]**

9. Write the output of the following SQL command:
SELECT ROUND(348.45, - 1);
(A) 340 **(B)** 350 **(C)** 348 **(D)** 360 **[1]**

10. What is the result of the following:
SELECT MOD (67, 4);
(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **[1]**

11. After a fight with your friend, you did the following activities. Which of these activities is not an example of cyber bullying?
(A) You sent an email to your friend with a message saying that "I am sorry".
(B) You sent a threatening message to your friend saying "Do not try to call or talk to me".
(C) You created an embarrassing picture of your friend and uploaded on your account on a social networking site.
(D) None of These **[1]**

12. To avoid problems while working on the Internet, you should follow these precautions.
(A) Install antivirus on your computer **(B)** Take the backup of your files regularly
(C) Do not click on unknown links **(D)** All of the above **[1]**

13. Polluters pay Principle means:
(A) Anyone causing the pollution will pay for the damage caused.
(B) Polluters paid well by NGOs.
(C) Polluters may get a bonus.
(D) Polluters are not the cause of pollution. **[1]**

14. SELECT RIGHT ('Information', 6);
Output will be –
(A) mation **(B)** Inform **(C)** ation **(D)** None of these **[1]**

15. We apply the aggregate function to a group of sets of tuples using the _____ clause.
(A) group by **(B)** group **(C)** group set **(D)** group attribute **[1]**

16. What values does the count(*) function ignore?
(A) Repetitive values **(B)** Null values **(C)** Characters **(D)** Integers **[1]**

Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is NOT the correct explanation of assertion (A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true

17. **Assertion (A):** The web is the common name for the World Wide Web, a subset of the Internet consisting of the pages that can be accessed by a web browser.
Reason (R): URL is a unique identifier used to locate a resource on the Internet. **[1]**

18. **Assertion (A):** Line graph is a tool for comparison and is created by plotting a series of several points and connecting them with a straight line.
Reason (R): You should never use line chart when the chart is in a continuous data set. **[1]**

Section - B

19. What is the difference between star topology and bus topology of network? **[2]**

OR

Murugan wants to send a report on his trip to the North East to his mentor. The report contains images and videos. How can he accomplish his task through the Internet?

20. Consider the table Organisation:

Table : Ogranisation

Org Code	Salary
C101	13000
C102	5000
C104	7000
C105	4000

(i) With SQL, how can you find the number of rows (records) in the Organisation table ?

(ii) What Output will be displayed by the following SQL statement:
Select AVG (Salary) FROM Organisation;

21. Write the output of the following SQL queries:

(i) SELECT MID('Technology', 2, 5);

(ii) SELECT INSTR('Computers', 'put'); **[2]**

22. Give the output:

```
import pandas as pd
data = [['Aadi', 500], ['Nikita', 1200], ['Kishan', 1500]]
df = pd.DataFrame (data, columns = ['Name','Fees'])
print(df)
```
[2]

23. What are the advantages of open source? **[2]**

OR

Define Phishing.

24. Why is the following statement used in every code that plots data in python.
import matplotlib pyplot as plt **[2]**

25. Write a small Python code to create a DataFrame with heading (a and b) from the list given below:
[[1, 2], [3, 4]], [[5, 6], [7, 8]] **[2]**

Section - C

26. What will be the output of the following querieson the basis of Employee table :

EmpID	EName	Salary
A001	Bob	5600
A002	John	Null
A003	Tom	5000

(i) SELECT AVG(Salary) FROM Employee;

(ii) SELECT Salary FROM Employee WHERE EmpId= 'A002';

(iii) SELECT EName FROM Employee WHERE Salary=NULL; **[3]**

27. Consider two objects A and B. A is a list where as B is a Series. Both have values 25, 40, 70, 115.
What will be the output of the following two statements considering that the above objects have been created already?

(a) print (A*2)

(b) print(B*2)

Justify your answer. AI **[3]**

28. Find the output:

```
import pandas as pd
algos={'search':['DFS','BFS','Binary Search','Linear','Shortest  Path(Dijkstra)'],
'sorting' :
['Quicksort', 'Mergesort', 'Heapsort', 'Bubble Sort', 'Insertion Sort'], 'machine
learning' :
['Random Forest',
'K Nearest Neighbor',
'Logistic Regression',
'K-Means Clustering',
'Linear Regression']}
algoDF = pd.DataFrame(algos)
print(algoDF)
```

[3]

29. What do you mean by data protection? **[3]**

OR

Define the following terms:

(i) Patent

(ii) Trademark

30. Consider the following SQL string: "Technology"

Write commands to display:

(i) "logy"

(ii) "nol"

(ii) Tech **[3]**

OR

Considering the same string "Technology"

Write SQL commands to display:

(i) The position of the substring 'log' in the string

(ii) The last 5 letters of the string

(iii) The length of the string

Section - D

31. Which function extracts a given number of characters from the left side of a supplied string? Explain with example. **[5]**

OR

Consider the following tables: COMPANY and MODEL

Table : Model

MODEL_ID	Comp_ID	Cost	Date of Manufacture
T020	1	2000	2010-05-12
M032	4	7000	2009-04-15
M059	2	800	2009-09-23
A167	3	1200	2011-01-12
T024	1	1300	2009-10-14

Table : Company

COMP_ID	Comp_Name	Comp_HO	Contact Person
1.	Titan	Okhla	C.B. Ajit
2.	Ajanta	Najafgarh	R. Mehta
3.	Maxima	Shahdara	B. Kohili
4.	Seiko	Okhla	R. Chadha
5.	Ricoh	Shahdara	J. Kishore

Note:

- Comp_ID is the Primary Key
- Model_ID is the Primary Key.
- Comp_ID is the Foreign Key referencing Comp_ID of Company table.

Write SQL commands for queries (i) to (iv) and output for (v).

(i) To display details of all models in the Model table in ascending order of DateOfManufacture.

(ii) To display details of those models manufactured in 2011 and whose Cost is below 2000.

(iii) To display the Model_ID, Comp_ID, Cost from the table Model, CompName and ContactPerson from Company table, with their corresponding Comp_ID.

(iv) To decrease the cost of all the models in Model table by 15%.

(v) Select count(distinct Comp_HO) from Company;

32. Software Development company has set up its new center at Raipur for its office and web based activities. It has 4 blocks of buildings named Block A, Block B, Block C and Block D.

Number of computers :

Block A	25
Block B	50
Block C	125
Block D	10

Shortest distances between various blocks in meters :

Block A to Block B	25
Block B to Block C	40
Block C to Block A	30
Block D to Block C	50

(i) Name the most suitable block where the server should be installed.

(ii) Suggest the type of network to connect all the blocks with suitable reason.

(iii) The company is planning to link all the blocks through secure and high speed wired medium. Suggest a way to connect all the blocks.

(iv) Suggest the most suitable wired medium for efficiently connecting each computer installed in every block out of the following network cables :

- Coaxial cable
- Ethernet cable
- Single pair telephone cable

(v) Suggest where all Hub(s)/Switch(es) should be placed in the network. **[5]**

33. What do you mean by CSV file ?

OR

The area under wheat cultivation last year in the following states correct to nearest lac hectares was :

State	Punjab	Haryana	U.P.	M.P.	Maharashtra	Rajasthan
Cultivated Area	220	120	100	40	80	30

Plot a graph for the data. Give a yellow border to each **[5]**

Section - E

Case based Subjective Questions

34. Give the output for (i) and (ii) and write SQL query for (iii):

Book_id	Book_name	Author_name	Publisher	Price	Type	Quantity
C0001	Fast Cook	Lata Kapoor	Oswaal	355	Cookery	5
F0001	The Tears	William Hopkins	First Publ.	650	Fiction	20
T0001	My First c++	Brain & Brooke	Oswaal	350	Text	10
T0002	C++ Brain works	A.W. Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Anna Roberts	First Publ.	750	Fiction	50

(i) SELECT COUNT(*) FROM Book; **[1]**

(ii) SELECT MAX(Price) FROM Book WHERE Quantity>=15; **[1]**

(iii) Display the names and price from books in ascending order of their prices. **[2]**

OR (Option for part iii only)

Display the Author names from book where book name is 'C++ Brain works'.

35. Consider the following DataFrame df:

Roll no.	Name	UT1	UT2	UT3	UT4
1	Prerna Singh	24	24	20	22
2	Manish Arora	18	17	19	22
3	Tanish Goel	20	22	18	24
4	Falguni Jain	22	20	24	20

(a) **(i)** Write down the command that will give the following output. **[1]**

```
Name    Tanish Goel
UT1     24
UT2     24
UT3     24
UT4     24
dtype: object
```

(ii) Which statement will give the exact number of values in each column of the dataframe? **[1]**

(b) Which command will display the column of the DataFrame? **[2]**

OR (Option for part iii only)

Ms. Sharma the class teacher wants to add a new column, the scores of Grade with the values, 'A','B','A','A','B','A', to the DataFrame. Help her to write the command to do so.

■■■

SOLUTIONS
Sample Question Paper-2
Informatics Practices

1. **Option (B) is correct.**
Explanation: ix attribute is primarily label location based indexer, with integer position fallback. It is used as a concise means of selecting data from a pandas object. **[1]**

2. **Option (D) is correct.**
Explanation: Pandas DataFrame is two-dimensional size-mutable, potentially heterogeneous tabular data structure with labeled axes (rows and columns). **[1]**

3. **Option (A) is correct.**
Explanation: The plot() function is used to draw points (markers) in a diagram. By default, the plot() function draws a line from point to point. **[1]**

4. **Option (D) is correct.**
Explanation: A gateway is a network device used in telecommunications that connects two networks with different transmission protocols together. Gateways serve as an entry and exit point for a network as all data must pass through or communicate with the gateway prior to being routed. **[1]**

5. **Option (C) is correct.**
Explanation: A bus topology is a topology for a Local Area Network (LAN) in which all the nodes are connected to a single cable. The cable to which the nodes connect is called a "backbone". If the backbone is broken, the entire segment fails. **[1]**

6. **Option (D) is correct.**
Explanation: Intellectual Property (IP) is protected in law by, for example, patents, copyright and trademarks, which enable people to earn recognition or financial benefit from what they invent or create. **[1]**

7. **Option (C) is correct.**
Explanation: A trademark is a sign capable of distinguishing the goods or services of one enterprise from those of other enterprises. **[1]**

8. **Option (A) is correct.**
Explanation: The SUBSTR() function extracts some characters from a string.
Syntax
SUBSTR(string, start, length) **[1]**

9. **Option (C) is correct**
Explanation: SQL MOD() function is used to get the remainder from a division. **[1]**

Commonly Made Error

- Sometime students base number as exponent and exponent as base number in Power function and dividend as divider and divider as dividend in Mod function

Answering Tip

- Students should remember that first argument is base value and second argument as exponent value in power function and in Mod function, first argument represents dividend and second argument represents divider.

10. **Option (B) is correct**
Explanation: INSTR() is a string function in standard query language (SQL) which returns the starting position or location of a substring or pattern in the given input string. **[1]**

11. **Option (B) is correct.**
Explanation: A passive digital footprint is a data trail you unintentionally leave online. **[1]**

12. **Option (B) is correct.** **[1]**

13. **Option (A) is correct.**
Explanation: Free and open-source software (FOSS) is software that can be classified as both free software and open-source software. **[1]**

14. **Option (A) is correct.**
Explanation: The COUNT() function returns the number of records returned by a select query. Note: NULL values are not counted.
Syntax
COUNT(expression) **[1]**

15. **Option (B) is correct.**
Explanation: DISTINCT statement is used to return only distinct (different) values. **[1]**

16. **Option (A) is correct.**
Explanation: LEFT() is used to return a specified number of characters from the left of the string. The number of characters returned is determined by the second argument. **[1]**

17. **Option (A) is correct.**
Explanation: SMTP is used to send and receive email. It is sometimes paired with IMAP or POP3 (for example, by a user-level application), which handles

the retrieval of messages, while SMTP primarily sends messages to a server for forwarding. **[1]**

18. **Option (B) is correct.**

Explanation: Pandas Series is a one dimensional labeled array capable of holding data of any type (integer, string, float, python objects, etc.). The axis labels are collectively called index. Pandas Series is nothing but a column in an excel sheet. **[1]**

19. Difference between web browser and web server are as follows : **[2]**

Web browser	Web server
It requests the server for the web documents and services.	Web server accepts, approve and respond to the request made by the web browser for a web document or services.
The web browser sends an HTTP request and gets an HTTP response.	The web server gets HTTP requests and sends HTTP responses.

OR

The difference between a website and a web page is that a website is a collection of different web pages containing information on a particular topic. A web page is an individual page of a big website usually containing more specific information. If we compare a website with a book, then a webpage can be compared with a single page of that book.

20. MOD( ) function is used to return the remainder of one expression by dividing it by another expression.

Syntax

```
MOD (n, m)
```

e.g.

```
SELECT MOD(20, 3);
```

Output

2 **[2]**

21. **(a)** SELECT MID ("Shutterstock", 8);

(b) SELECT SUBSTR("Shutterstock" ,5,3); **[2]**

22. Output

	Name	Age
0	Alex	10
1	Bob	12
2	Claske	13

[2]

23. **(i) Financial identity theft:** When the stolen identity is used for financial gain.

(ii) Criminal identity theft: Criminals use a victim's stolen identity to avoid detection of their true identity.

(iii) Medical identity theft: Criminals can seek medical drugs or treatments using a stolen identity. **[2]**

OR

It grants legal rights to creators for their original works like writing, photograph, audio recordings, video, sculptures, architectural works, computer software, and other creative works like literary and artistic work. Copyrights are automatically granted to creators and authors. Copyright law gives the copyright holder a set of rights, that they alone can avail legally. The rights include right to copy (reproduce) a work, right to create derivative works based upon it, right to distribute copies of the work to the public and right to publicly display or perform the work. It prevents others from copying, using or selling the work. **[2]**

24. A series is one dimensional object that can hold any data type such as integers, floats, and strings. It has only one axis. A DataFrame is two dimensional object that can hold different data types. Individual columns of a Dataframe can act as an separate series object. **[2]**

25.

```
import pandas as pd
M1 = pd. Series ([45, 65, 24, 89], index = ['Term1', 'Term2', 'Term3', 'Term4'])
print(M1)
```

[2]

26. **(i)** 50

(ii) 40

(iii) 81666.66 **[3]**

27. Importing pandas library

You need to import or load the Pandas library first in order to use it. By "Importing a library", it means loading it into the memory and then you can use it. Run the following code to import pandas library:

```
import pandas as pd
```

The "pd" is an alias or abbreviation which will be used as a shortcut to access or call pandas functions. To access the functions from pandas library, you just need to type pd.function instead of pandas. function every time you need to apply it. **[3]**

28. **(i)** To change a column use syntax.

<dataframe>. [<columnname>] = <new value>

(ii) To change a row, use syntax

<dataframe>.[<rowname>, :] = <new value>

(iii) To change an individual data value use syntax :

<dataframe>.<columnname> [<row name/ label>] = <newvalue> **[3]**

Commonly Made Error

- Sometimes Students get confused in programming syntax.

Answering Tip

- Student should learn the proper syntax of programming.

29. Software license is a document that provides legally binding guidelines for the use and distribution of software. Software licenses typically provide end users with the right to create one or more copies of

the software without violating copy rights.

Types of software license

(i) Proprietary license is a license where the copyright stays with the producer and the user is granted the right to use the software.

(ii) GNU General Public License (GPL) are agreements under which open source software usually licensed.

(iii) End User License Agreement (EULA) indicates the terms under which the end user may use the software.

(iv) Creative commons (CC) License is a public copyright license that enables free distribution of a copyrighted work. **[3]**

OR

(i) Eyes strain: When we gaze at a screen for long periods of time, we often forget to blink. In fact, research has shown that digital eye strain reduces our blink rate by half, which means the tears that protect our eyes evaporate without being replaced. Additionally, reading the smaller fonts on a smartphone or other portable device can intensify the strain.

(ii) Sleep Disorders: We love our devices so much that many of us even sleep with them. One study found that 72% of smartphone owners keep their phone next to their bed at night to ensure they do not miss a thing. It might see like a harmless habit but late night technology use can interfere with your ability to sleep. To avoid sleep disruption, try replacing late night technology use with sleep conducive activities such as taking a bath or reading in bed. Resisting the urge to keep your phone on your nightstand can also help minimize night time interruptions.

(iii) Physical Inactivity: When we are using technology like computers, video games or TVs, we generally are not exercising. That's why there's an increasing body of research linking the overuse of digital devices to decreasing exercise and fitness levels.

Logically, spending more time on watching TV or playing video games reduces the time you spend staying active. **[3]**

30. **Single row function:** LENGTH()

Aggregate function: MAX()

A single row function works on every row of a table and hence gives output for each row in the table An aggregate function also known as multiple row function works on a group of rows and returns only one output. **[3]**

OR

(i) 13

(ii) 12

(iii) ORLD

Commonly Made Error

- Sometime Students execute the nested function from outward to inward direction, that gives wrong output.

Answering Tip

- Students should remember that nested functions always processed from inward to outward direction

31. The RIGHT() function extracts a given number of characters from the right side of a specified character string. For example, RIGHT('SQL Server', 6) returns Server.

The syntax of the RIGHT() function is as follows:

RIGHT (input_string , number_of_characters)

In this syntax:

The input_string can be a literal string, variable, or column. The result of the input_string can be in any data type, except for TEXT or NTEXT, that is implicitly converted to VARCHAR or NVARCHAR.

The number_of_characters is a positive integer that specifies the number of characters of the input_string will be returned.

Note that the RIGHT() function returns a value of VARCHAR when the input_string is a non-Unicode character data type or NVARCHAR if the input_string is a Unicode character data type.

The following statement uses RIGHT() to return the three rightmost characters of the character string SQL Server:

```
SELECT RIGHT('SQL Server',6) Result_string;
```

Here is the output:

```
Result_string
-------------
Server
```

[5]

OR

(i) SELECT Name, City FROM ABC WHERE Gender = 'F' and Basic_salary> 40,000;

(ii) SELECT Name, Basic_salary FROM ABC WHERE Name LIKE ' G%';

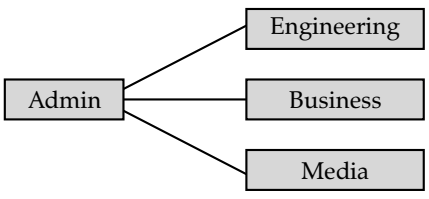
(iii) DELETE FROM ABC WHERE Pin_Code = 182141;

(iv) SELECT PID, City, Pin_Code FROM ABC ORDER By Pin_Code DESC;

(v) PID **[5]**

32. **(i)** Admin (Due to maximum number of computers)

(ii)



(iii) Firewall or router
(iv) Video conferencing
(v) IEEE 802.11 Wi-Fi Router and IEEE 802.11 Wi-Fi Router **[5]**

33. **(i)** drop()
(ii) print(df [sub3].dtype)
(iii) print(df'[Name'].str. contains("Siddhant''))
(iv) print(df.loc[2:7])
(v) print(len(df.columns)) **[5]**

OR

```
from matplotlib import pyplot as plt
plt.bar([0.25, 1.25, 2.25, 3.25, 4.25], [50, 40, 70, 80, 20],
label = "Science", width =.5)
plt.bar([.75, 1.75, 2.75, 3.75, 4.75], [80, 20, 20, 50, 60],
label = "Maths", color = 'r', width = .5)
plt.legend( )
plt.xlabel('Months')
plt.ylabel('Subject')
plt.title('Information')
plt.show( )
```

Commonly Made Error

- Some students are good in theory but not in programming, so they did mistake in coding.

Answering Tip

- Students should practice the program and coding practically so that their concepts could be clear.

34. **(i)** SELECT Name FROM EXAM WHERE Division='FIRST' ORDER BY Name ASC; **[1]**

(ii) SELECT COUNT(*) FROM EXAM WHERE Subject IN ('Accounts','Informatics'); **[1]**

(iii)

COUNT
6

[2]

OR

MIN (average)
68

35. **(a)** **(i)** df['eligible']='yes'
(ii) df.drop('T04') **[1]**

(b) df.loc['T03',:]
DataFrame.loc[] method is a method that takes only index labels and returns row or dataframe if the index label exists in the caller data frame. **[2]**

OR

df.head(3)
head(n) is used to get the first n rows of the DataFrame. It takes one optional argument n (number of rows you want to get from the start). By default n = 5, it return first 5 rows if value of n is not passed to the method.

Commonly Made Error

- Some students get confused between Series and Dataframe and they write about Series instead of Dataframe.

Answering Tip

- Students should be clear all definition and their applications

■■■

SOLUTIONS
Sample Question Paper-3
Informatics Practices

1. **Option (D) is correct.**
Explanation: Since it is a simple text file it can be viewed in notepad, word processor or a spreadsheet software. **[1]**

2. **Option (A) is correct.**
Explanation: .drop() is used to delete row(s) in a dataframe. To delete row(s) index labels are used and to delete columns, column labels are used. **[1]**

3. **Option (C) is correct.**
Explanation: The tail function returns last n rows from a dataframe. The default value of n is 5. As Sandhya has not specified any value for n so by default last 5 rows are being displayed. **[1]**

Commonly Made Error

- Some students get confused between head() and tail() functions

Answering Tip

- Students should learn all concepts individually with their syntax and examples.

4. **Option (D) is correct.**
Explanation: ROUND( ): Function is used to round up the number to the upwards or downwards whichever the nearest whole number. **[1]**

5. **Option (B) is correct.**
Explanation: SUBSTR extracts some characters from a string. **[1]**

6. **Option (C) is correct.**
Explanation: A HAVING clause in SQL specifies that an SQL SELECT statement must only return rows where aggregate values met the specified conditions. After the aggregating operation, HAVING is applied, filtering out the rows that don't match the specified conditions. **[1]**

7. **Option (B) is correct.**
Explanation: A dynamic web page is a web page that displays different content each time it's viewed. For example, the page may change with the time of day, the user that accesses the webpage, or the type of user interaction. There are two types of dynamic web pages: Client-side Scripting and Server-side Scripting. **[1]**

8. **Option (B) is correct.**
Explanation: A star topology is a topology for a Local Area Network (LAN) in which all nodes are individually connected to a central connection point, like a hub or a switch. **[1]**

9. **Option (B) is correct.**
Explanation: The concept of digital privacy can best be described as the protection of the information of private citizens who use digital mediums. **[1]**

Commonly Made Error

- Some students get confused between data privacy and data secrecy and they write about data secrecy instead of data privacy.

Answering Tip

- Reading and proper understanding of the question is very important.

10. **Option (D) is correct.**
Explanation: Open-source software is computer software that is released under a license in which the copyright holder grants users the rights to use, study, change, and distribute the software and its source code to anyone and for any purpose. **[1]**

11. **Option (A) is correct.**
Explanation: CPCB is responsible for the control and monitoring of air and water quality in India. **[1]**

12. **Option (D) is correct.**
Explanation: When this e-waste is not properly handled and simply thrown out with the garbage, ultimately ending up in landfill, it means both human health and the environment are at risk. **[1]**

13. **Option (D) is correct.**
Explanation: The primary objectives of the IT Act, 2000 are: Granting legal recognition to all transactions done through electronic data exchange, other means of electronic communication or e-commerce in place of the earlier paper-based communication. **[1]**

14. **Option (C) is correct.**
Explanation: The RIGHT() function extracts a given number of characters from the right side of a specified character string. **[1]**

15. **Option (A) is correct.**
Explanation: LEFT( ): It is used to return a specified number of characters from the left of the string. The number of characters returned is determined by the second argument. **[1]**

16. **Option (C) is correct.**
Explanation: DISTINCT statement is used to return only distinct (different) values. **[1]**

17. **Option (A) is correct.**
Explantation: NumPy, which stands for Numerical Python, is a library consisting of multidimensional array objects and a collection of routines for processing those arrays. Using NumPy, mathematical and logical operations on arrays can be performed. NumPy is a Python package. For most data types, pandas uses NumPy arrays as the concrete objects contained with a Index , Series , or DataFrame. **[1]**

18. **Option (C) is correct.**
Explanation: Cookies are plain text files which store the browsing-related information on user's computer. These enable you to save password for the website and all the customer setting for the website in the browser for later visits. You can enable or disable cookies from browser settings. You can either allow or block third-party cookies on your browser. **[1]**

19. **(a)** Hypertext Transfer Protocol
(b) Hypertext Markup Language
(c) Post Office Protocol version 3
(d) Internet Protocol **[2]**

OR

Differences between static and dynamic web pages:

Static Web Page	Dynamic Page
1. Content of this type of webpage cannot be chaged at run time.	**1.** Content of this type of webpage can be changed at run time.
2. No interaction with server's in case of static web pages.	**3.** Interaction with server database is possible in case of dynamic web page.

20. **COUNT (expr):** This function returns a count of the number of not-NULL values of expr in the rows retrieved by a SELECT statement. COUNT() returns 0 if there are no matching rows.
e.g. SELECT COUNT(student_name) FROM student; **[2]**

21. Correct statement:
SELECT Category, AVG(Salary) FROM Hotel GROUP BY Category; **[2]**

22. The answer to this question varies based on the requirements for plotting data. Matplotlib is the library used for plotting in Python language, but it needs a lot of fine tuning to ensure that the plots look shiny. Data scientists prefer Seaborn to create statistically and aesthetically appealing meaningful plots. **[2]**

23. **(a) Legal and Legislative Framework:** To have strong and effective IPR laws, which balance the interests of right owners with larger public.
(b) Enforcement and Adjudication: To strengthen the enforcement and adjudication mechanisms for combating IPR infringements. **[2]**

OR

Netiquette is a way to communicate over Internet. In the real world, we use a manner to talk so that the exact meaning could successfully convey to the listener. On internet, this manner is known as netiquette which helps the user exact idea of what is said.
In virtual world, if we are talking to anybody can understand what we are saying by seeing facial expression, way of talking, posture etc. But on Internet, it's not possible because there is only non-verbal communication **[2]**

24. The two key features of Pandas are :
(i) It can process a variety of data sets in different formats: time series, tabular heterogeneous arrays and matrix data.
(ii) It facilitates loading and importing data from various sources such as CSV and DB/SQL. **[2]**

25. The Pandas is a high performance open source library for data analysis in Python developed by Wes McKinney in 2008. Over the years, it has become the de-facto standard library for data analysis using Python. **[2]**

26. **(i)** SELECT FLCODE, START, DESTINATION, NO_FLIGHTS FROM FLIGHT ORDER BY NO_FLIGHTS DESC ;
(ii) SELECT FLCODE, START FROM FLIGHT WHERE DESTINATION="JAIPUR";
(iii) 7 **[3]**

27. head() function is used to get the first n rows.
Syntax Series.head (n=5)
Here, n is the selected number of rows. It is an int type and has default value 5. tail() function returns last n rows from the object based on position. It is useful for quickly verifying data.
Syntax Series.tail(n=5)
Here, n is the selected number of rows whose default value is 5. **[3]**

28.
```
import pandas as pd
d={'One' : pd.Series ([1, 2, 3], index
= ['a', 'b', 'c']),
'Two' :pd.Series ([1, 2, 3, 4], index =
['a', 'b', 'c', 'd'])}
df=pd.DataFrame (d)
print(df)
print df('one')
  Output1
```

```
          One     Two
a         1.0     1
b         2.0     2
c         3.0     3
d         NaN     4
Output2
          One
a         1.0
b         2.0
c         3.0
d         NaN
Name: one, dtype: float64
```

29. We sometime share our personal information with our family and friends in emergency and hurdle. They can misuse our personal information and we can be victim of identity theft.

(i) The attacker can steal our information by accessing our documents like bills, our bank documents, our PAN card, driving license etc., if we are using weak passwords.

(ii) Our private information can be stolen if someone uses our personal computer or our phone because when we allow them to use our personal computer means we are giving permission to make uses of our personal data.

(iii) Our personal data can be stolen by the attacker by making fake call or sending fake e-mails.

(iv) An attacker can steal our information by keeping an eye on you when we are entering our information. For example, when we are logging our networking site by entering our user id and password then someone could see it if we are not careful about it. **[3]**

OR

E-waste management is also known as urban mining. It is a technique in which the part of products which are dumped in as the e-waste can be either sold out or reuse. This technique should be opted, in order to avoid disposal of heavy metals, plastics and glass generated from e-waste. As this can pollute the air or seep into waterways. Thus by recycling e-waste the demand for mining heavy metals and reduction in the greenhouse gas emissions from materials can be decreased significantly. Since, India is one of the largest country producing 350000 tons of e-waste every year.

Thus by adapting proper e-waste management technique, huge amount of metals and plastic can be saved each year.

The following are the methods to control e-waste,

(i) By Recycling the e-waste.

(ii) By Reusing the e-waste.

(iii) By Proper Disposal of e-waste.

(iv) By purchasing environmentally friend electronics.

(v) By donating the e-waste to e-cycling centers.

30. **(i)** India

(ii) 89.39

(iii) 625 **[3]**

OR

(i) SELECT INSTR('Programming', 'gram');

(ii) SELECT LEFT('Programming', 5);

(iii) SELECT RIGHT('Programming', 3);

31. There are various built-in functions include in MySQL for mathematical calculations. These mathematical functions accept numeric value, perform some operations on it and also return numeric value in result.

Some mathematical functions used in MySQL are as follows.

- **POWER( ):** This function is used to get the power of the given values.
  Syntax:
  POWER (m, n)
  This function returns m raised to the nth power.
- **ROUND( ):** This function is used to round up the number to the upwards or downwards whichever the nearest whole number.
  Syntax:
  ROUND(number)
  If you want to get number with certain number of decimal places, you can also pass that number and use following syntax:
  ROUND(number, decimal place); **[5]**

OR

(i) Select carname, round(cost,1) from carmarket;

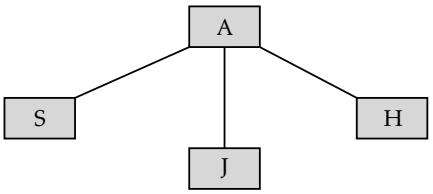
(ii) select carname, color, instr(color,'E') from carmarket;

(iii) select carname,lcase(company) from carmarket where year(dom) = 2020;

(iv) select count(*),year(dom) from carmarket group by year(dom);

(v) Cardinality = 7 and Degree = 6

32. **(i)**



(ii) Server can be placed in the A buildings as it has the maximum number of computers.

(iii) Repeater can be placed between A and S and A and J buildings as the distance is more than 110 mt. Hub /Switch in A building as it is hosting the server.

(iv) Radio waves can be used in hilly region as they can travel through obstacles.

(v) WAN as it is outside the city. **[5]**

33. DataFrame is a two dimensional labelled array. Its columns types can be heterogeneous i.e., of varying types. It is similar to structured arrays in NumPy with mutability added**.** It is conceptually analogous to a table or spreadsheet of data.

```
import pandas as pd
d={'One' : pd.Series ([1, 2, 3], index=['a', 'b', 'c']),
'Two' :pd.Series([1, 2, 3, 4], index=['a', 'b', 'c', 'd'])}
df=pd.DataFrame(d)
print("Adding a new column by passing as series :")
df ['Three']=pd.Series([10, 20, 30], index = ['a', 'b','c'])
print(df)
print("Adding a new column using the existing columns in DataFrame")
df['Four']=df['One'] + df['Three']
print(df)
```

[5]

OR

```
from matplotlib import pyplot as plt
x = [2, 6, 11]
y = [4, 6, 9]
x2 = [6, 4, 12]
y2 = [6, 7, 16]
plt.plot (x, y, 'g', label = 'line one', linewidth = 5)
plt.plot(x2, y2, 'c', label = 'line two', linewidth = 5)
plt.title('Information')
plt.ylabel('Y-axis')
plt.xlabel('X-axis')
plt.legend()
plt.grid (True, color = 'k')
plt.show( )
```

Commonly Made Error

- Some students are good in theory but not in programming, so they did mistake in coding.

Answering Tip

- Students should practice the program and coding practically so that their concepts could be clear.

34. **(i)** Kat **[1]**

(ii) DELHI **[1]**

(iii) Output

Kol

LEFT() function in MySQL is used to extract a specified number of characters from the left side of a given string. It uses its second argument to decide, how many characters it should return. Syntax : LEFT (str, len) **[2]**

OR

Output

4

The MySQL LENGTH function returns the length of the specified string (measured in bytes).

Syntax

LENGTH(string)

35. **(a)** **(i)** pd **[1]**

(ii) DataFrame **[1]**

(b) df[['Month','Passengers']]

[df['Month']=='Jan'] **[2]**

OR

df.index=["Air India", "Indigo", "Spicejet", "Jet", "Emirates"]

■■■

SOLUTIONS
Sample Question Paper-4
Informatics Practices

1. **Option (A) is correct.**
Explanation: The SUBSTR() function extracts some characters from a string.
Syntax
SUBSTR(string, start, length) **[1]**

2. **Option (A) is correct.**
Explanation: A sequence is a group of items with a deterministic ordering. Pandas head() method is used to return top n (5 by default) rows of a data frame or series. **[1]**

Commonly Made Error

- Some students get confused between head() and tail() functions.

Answering Tip

- Students should learn all concepts individual with their syntax and examples.

3. **Option (C) is correct.**
Explanation: The syntax for iloc is: dataframe.iloc[<start row index>:<end row index>,<start column index>:<end column index>]
Here start and end index for rows and columns act as slicing and the end index is excluded. So, for first 4 rows indexes will be 0:4 and second to fourth columns it will be 1:4. **[1]**

4. **Option (B) is correct.**
Explanation: To specify common width for all bars width argument having a scalar float value in the bar() function as:
<matplotlib.pyplt>.bar(<x-sequence>, <ysequence>, width=<float value>) **[1]**

5. **Option (D) is correct.**
Explanation: SQL aggregation is the task of collecting a set of values to return a single value. It is done with the help of aggregate functions, such as SUM, COUNT, and AVG. For example, in a database of products, you might want to calculate the average price of the whole inventory. **[1]**

6. **Option (D) is correct.**
Explanation: SQL aggregation is the task of collecting a set of values to return a single value. It is done with the help of aggregate functions, such as SUM, COUNT, and AVG. Aggregate functions are used only with GROUP BY clause. **[1]**

7. **Option (C) is correct.**
Explanation: In a mesh topology there is no central connection point. Instead, each node is connected to at least one other node and usually to more than one. Each node is capable of sending messages and receiving messages from other nodes. The nodes act as relays, passing on a message towards its final destination. **[1]**

8. **Option (B) is correct.**
Explanation: URL is an acronym for Uniform Resource Locator and is a reference (an address) to a resource on the Internet. A URL has two main components: Protocol identifier: For the URL http://example.com , the protocol identifier is http . Domain name: For the URL http://example.com , the domain name is example.com. **[1]**

9. **Option (D) is correct.**
Explanation: An antivirus is software that protects against computer viruses, a type of malware that self-replicates by inserting its code into other software programs. **[1]**

10. **Option (C) is correct.**
Explanation: Any screen or book should be placed at eye level for comfortable viewing and reading. **[1]**

11. **Option (B) is correct.**
Explanation: Intellectual property rights include patents, copyright, industrial design rights, trademarks, plant variety rights, trade dress, geographical indications, and in some jurisdictions trade secrets. **[1]**

12. **Option (C) is correct.**
Explanation: MySQL is an open-source relational database management system **[1]**

13. **Option (B) is correct.**
Explanation: We should never talk to unknown person over the internet. Ignoring any cyber bully will provoke him to do more such things, deleting the chat will be no solution as that person may again send similar messages. The best way is to tell her parents / teacher or some other trusted adults so that they can help her. **[1]**

14. **Option (A) is correct.**
Explanation: LEFT( ): It is used to return a specified number of characters from the left of the string. The number of characters returned is determined by the second argument. **[1]**

15. **Option (D) is correct.**

Explanation: DISTINCT statement is used to return only distinct (different) values. **[1]**

16. **Option (B) is correct.**
Explanation: ORDER BY clause is used to sort a result set returned by a SELECT statement. To sort a result set in ascending order, use ASC Keyword and in descending order, use DESC Keyword. The ORDER BY clause sorts the result set in ascending order by default. **[1]**

17. **Option (C) is correct.**
Explanation: Iteration is the repetition of a process in order to generate an outcome. The sequence will approach some end point or end value. Each repetition of the process is a single iteration, and the outcome of each iteration is then the starting point of the next iteration. iterrows() returns the iterator yielding each index value along with a series containing the data in each row. **[1]**

18. **Option (A) is correct.**
Explanation: A router is more powerful and intelligent than hub or switch. It has advanced capabilities as it can analyze the data and decide the data is packed and send it to the other network. It can handle huge packets. It can be wired or wireless, both. A wireless router can provides access to many devices like smartphones, and connected devices. **[1]**

19.

Internet	Intranet
(i) It is used to connect different net work of computer simultaneously.	**(i)** It is the type of internet which is used privately.
(ii) There are multiple users and it provides unlimited number of information to the users.	**(ii)** There are limited number of users and it provide limited number of information to its user.

[2]

OR

A web Serves is the main centralized computer system that hosts and runs websites it has a computer program that distributes web pages as they are requisitioned the basic role of the web serves is to store, process and delivery the web pages to the users as and when required

20. LCASE ( ) function converts the argument string to the lowercase and UCASE ( ) function converts the argument string to the uppercase.

```
mysql>SELECT LCASE ('COMPUTER Science');
Output
computer science
mysql>SELECT UCASE('COMPUTER Science');
Output
COMPUTER SCIENCE
```
[2]

21. **(a)** SELECT SUBSTR("Environment",5);
(b) SELECT MID ("Environment", 8, 4); **[2]**

22. **(i) Data representation:** It can easily represent data in a form naturally suited for data analysis via its DataFrame and series data structures in a concise manner.
(ii) Data sub setting and filtering: It provides for easy sub setting and filtering of data, procedures that are a staple of doing data analysis. **[2]**

23. Cyber crime refers to the use of a computer to commit a crime. As a criminal activity, it began when hackers started illegally accessing high-level computer networks. Some examples of cyber crime include credit card and identity theft, network intrusions and software piracy. **[2]**

OR

Culture defines the integrated behaviour of patterns of members living in a society. The term technology is the study of designing, development, implementation, management of computer systems. Technology and culture are interrelated with each other. As technology increases, it will create either a positive or a negative impact on the culture and society. Consequently, as cultures changes the demand for development of new technology increases.

24. Output

	one
a	1.0
b	1.0
c	1.0
d	NaN

[2]

25. Histogram is a type of graph that is widely used in mathematics, especially in statistics. The histogram represents the frequency of occurrence of a specific phenomenon which lies within a specific range of values, which are arranged in consecutive and fixed intervals. **[2]**

26. **(i)** SELECT NAME, SALARY FROM Emp ORDER BY SALARY DESC;
(ii) SELECT COUNT(*) FROM Emp WHERE NAME LIKE "K%";
(iii) SELECT NAME, ADDRESS FROM Emp WHERE AGE > 25; **[3]**

Commonly Made Error

- Some students do not use semicolon at the end of the query.

Answering Tip

- Use semicolon at the end of the query and write query in proper manner.

27. **(a)** will give the output as:
[10, 30, 70, 120, 10, 30, 70, 120, 10, 30, 70, 120]

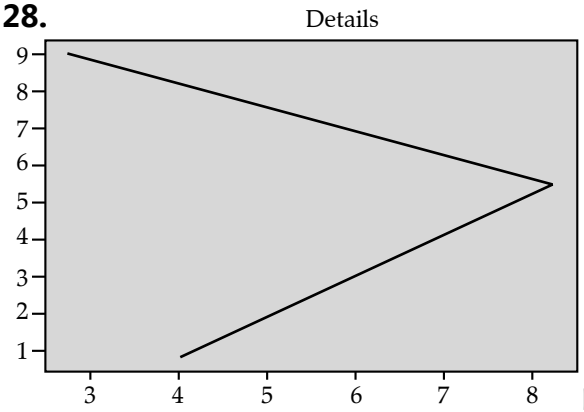
(b) will give the output as

0	30
1	90
2	210
3	360

Justification: In the first statement x represents a list so when a list is multiplied by a number, it is replicated that many number of times.

The second y represents a series. When a series is multiplied by a value, then each element of the series is multiplied by that number. **[3]**

28.



[3]

29. The Constitution of India does not patently grant the fundamental right to privacy. India presently does not have any express legislation governing data protection or privacy. Privacy law refers to the laws that deal with the regulating, storing, and using of personally identifiable information of individuals, which can be collected by governments, public or private organizations, or other individuals.

The four most common types of invasion of privacy torts are as follows:

- Appropriation of name or likeness
- Intrusion upon seclusion
- False Light
- Public Disclosure of Private Facts **[3]**

Commonly Made Error

- Privacy law refers to the laws that deal with the regulating, storing, and using of personally identifiable information of individuals.

Answering Tip

- Privacy laws are based on fair information Practice.

OR

Open data is data that can be freely used, re-used and redistributed by anyone-subject only, at most, to the requirement to attribute and share alike.

(i) Availability and Access: The data must be available as a whole as and at no more than a reasonable reproduction cost, preferably by downloading over the internet. The data must also be available in a convenient and modifiable form.

(ii) Re-use and Redistribution: The data must be provided under terms that permit re-use and redistribution including the intermixing with other data sets.

(iii) Universal Participation: Everyone must be able to use, re-use and redistribute, there should be no discrimination against fields of endeavour or against a person or groups. For example, 'non-commercial' restrictions that would prevent 'commercial' use or restrictions of use for certain purpose (e.g., only in education,) are not allowed.

30. **(i)** oard
(ii) 3
(iii) 17 **[3]**

OR

(i) SELECT INSTR("Environment", "ment");
(ii) SELECT LEFT("Environment",3);
(iii) SELECT LENGTH("Environment");

31. Group functions are also known as aggregate functions. These functions are as follows:

(i) COUNT (): This function returns the number of rows in the table that satisfies the condition specified in WHERE clause. If the where clause condition is not specified then the query returns the total number of rows in the table.

For example: If you want the number of employees in a particular department, the query would be

SELECT COUNT (*) FROM Employee WHERE Dept = 'Electronics';

If you want the total number of employees in all departments, the query would take the form:

SELECT COUNT (*) FROM Employee;

(ii) MAX (): This function is used to get the maximum value from a column.

To get the maximum salary drawn by an employee, the query would be

SELECT MAX (Salary) FROM Employee;

(iii) MIN (): This function is used to get the minimum value from a column.

To get the minimum salary drawn by an employee, the query would be

SELECT MIN (Salary) FROM Employee;

(iv) AVG (): This function is used to get the average value of a numeric column.

To get the average salary, the query would be

SELECT AVG (salary) FROM Employee;

(v) Sum (): This function is used to get the sum of a numeric value in column.

To get the total salary given out to the employees

SELECT SUM (Salary) FROM Employee;

OR

(i) Select left(COLOUR,3) from GARMENT where COLOUR like "B%";

(ii) Delete from GARMENT where GCode =116;

(iii)

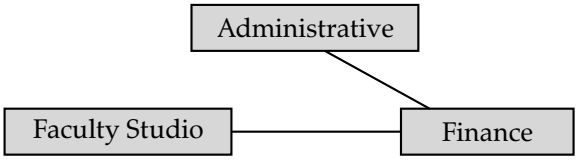
GNAME	PRICE
Jacket	4,000.00
Jeans	1,600.00
Trousers	1,500.00
Tshirt	1,400.00
Ladies Top	1,200.00
Skirt	1,100.00

(iv) Update GARMENT set COLOUR ="Orange" where Gcode=116;

(v) Degree=5 & Cardinality=6

32. **(i)** Faculty Studio

(ii)



(iii) LAN (Local Area Network)

(iv) Satellite connection

(v) Radio Wave would be an economic way to connect it with reasonably high speed. It offers mobility & freedom from land acquisition rights that are required for laying, repairing cables. **[5]**

33. Data structure is defined as the storage and management of the data for its efficient and easy access in the future where the data is collected, modified and the various types of operations are performed on the data respectively.
Pandas provide two data structures for processing the data, which are described below:

(i) **Series:** It is a one dimensional object similar to an array, list or column in a table. It will assign a labelled index to each item in the series. By default, each item will receive an index label from 0 to N, where N is the length of the series minus one.

(ii) **Data Frame:** It is a tabular data structure comprised of rows and columns. Data frame is defined as a standard way to store data and has two different indexes i.e., row index and column index. **[5]**

OR

```
import numpy as np
import matplotlib.pyplot as plt
objects = ('Python', 'C++', 'Java', 'Perl')
y_pos = np.arange(len(objects))
performance = [10,8,6,4]
plt.bar(y_pos, performance, align='center', alpha=0.5)
plt.xticks(y_pos, objects)
plt.ylabel('Usage')
plt.title('Programming language')
plt.show()
```

Commonly Made Error

- Some students get confused in different types of graph and they mistake in coding while generating graph.

Answering Tip

- Students should practice all graphs on computers so that they could not make mistake in exam.

34. **(i)** 501 **[1]**

(ii) 4 **[1]**

(iii) Output
333
The ROUND() function in MySQL is used to round a number to a specified number of decimal places. If no specified number of decimal places is provided for round off, it rounds off the number to the nearest integer. **[2]**

OR

Output
2000-11-01
The MySQL MAX() function is used to return the maximum value in a set of values of an expression. This aggregate function is useful when we need to find the maximum number, selecting the most expensive product, or getting the largest payment to the customer from your table.

35. **(a)** **(i)** little

(ii) 2 **[1]**

(b) Output **[1]**

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

[2]

OR

skating	3
kho kho	4

■■■

SOLUTIONS
Sample Question Paper-5
Informatics Practices

1. **Option (C) is correct.**
Explanation: Pandas was developed by Wes Mc Kinney in 2008. Wes McKinney is an American software developer and businessman. **[1]**

2. **Option (C) is correct.**
Explanation: Option C will be the correct answer because the slicing [::-3] represents all the elements from last index to first index with the gap of 3 in reversed order. **[1]**

3. **Option (D) is correct.**
Explanation: matplotlib is used for 2D plots in Python. Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. **[1]**

4. **Option (A) is correct.**
Explanation: The GROUP BY Statement in SQL is used to arrange identical data into groups with the help of some functions. i.e if a particular column has same values in different rows then it will arrange these rows in a group. **[1]**

Commonly Made Error

- Sometimes Students get confused between "Group by" and "Having".

Answering Tip

- The HAVING clause is used instead of WHERE with aggregate functions. While the GROUP BY Clause groups rows that have the same values into summary rows.

5. **Option (B) is correct.**
Explanation: COUNT(*) counts the rows in a table. COUNT(column) counts the entries in a column - ignoring null values. **[1]**

6. **Option (A) is correct.**
Explanation: The GROUP BY Statement in SQL is used to arrange identical data into groups with the help of some functions. i.e if a particular column has same values in different rows then it will arrange these rows in a group. In the query, GROUP BY clause is placed before ORDER BY clause if used any. **[1]**

7. **Option (B) is correct.**
Explanation: A device server is "a specialized network-based hardware device designed to perform a single or specialized set of functions with client access independent of any operating system or proprietary protocol." PCs have been used to network serial devices with some success. **[1]**

8. **Option (B) is correct.**
Explanation: In computer networking, because repeaters work with the actual physical signal, and do not attempt to interpret the data being transmitted, they operate on the physical layer, the first layer of the OSI model. **[1]**

9. **Option (C) is correct.**
Explanation: There are two main storages of digital footprints:
Browser Settings: The digital footprints can be saved in browser history, cookies, password, auto fill data, etc. Web Server and Database: Every website has its own database. When the user enters data and fills it up to them it can be saved in the database. **[1]**

10. **Option (D) is correct.**
Explanation: Intellectual property rights are legal rights that provide creators protection for original works, inventions, or the appearance of products, artistic works, scientific developments, and so on. **[1]**

11. **Option (C) is correct.**
Explanation: Copyright infringement refers to the unauthorized use of someone's copyrighted work. **[1]**

12. **Option (A) is correct.**
Explanation: A trademark is a type of intellectual property consisting of a recognizable sign, design, or expression which identifies products or services of a particular source from those of others. **[1]**

13. **Option (B) is correct.**
Explanation: Phishing is a cybercrime in which a target or targets are contacted by email, telephone or text message by someone posing as a legitimate institution to lure individuals into providing sensitive data such as personally identifiable information, banking and credit card details, and passwords. **[1]**

14. **Option (A) is correct.**
Explanation: LEFT() is used to return a specified number of characters from the left of the string. The number of characters returned is determined by the second argument. **[1]**

15. **Option (A) is correct.**

Explanation: DISTINCT statement is used to return only distinct (different) values. **[1]**

16. **Option (C) is correct.**
Explanation: ORDER BY clause is used to sort a result set returned by a SELECT statement. To sort a result set in ascending order, use ASC Keyword and in descending order, use DESC Keyword. The ORDER BY clause sorts the result set in ascending order by default. **[1]**

17. **Option (A) is correct.**
Explanation: In a Mesh topology there is no central connection point. Instead, each node is connected to at least one other node and usually connected to more than one. Each node is capable of sending messages to and receiving messages from other nodes. The nodes act as relays, passing on a message towards its final destination. **[1]**

18. **Option (A) is correct.**
Explanation: A bar graph shows comparisons among discrete categories. One axis of the chart shows the specific categories being compared, and the other axis represents a measured value. **[1]**

19. A server is a computer or system that provides resources, data, services or programs to other computers, knows as clients over a network. A server may be designed to do a single task such as a mail server, which accepts and stores email and then provides it to a requesting client. There are different types of server as file server, print server, database server, etc. **[2]**

OR

Type of network that will be formed: Wide Area Network (WAN)
Transmission media to be used: Satellite

20. SELECT Deptcode, MAX(Salary) FROM Employee GROUP BY Deptcode;

21.

NOW()	SYSDATE()
(i) It gives us the current time and date of when you entered the function.	**(i)** It gives the date and time after the code is executed.
(ii) NOW() can store the date value on timestamp.	**(ii)** SYSDATE() can store all on this fields.

[2]

22. Pandas series is one dimensional labelled array capable of holding data of any type (integer, string, float, Python objects etc.). The axis labels are collectively called index.

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

23. When the personal data of the user is collected without letting him know or collection of personal data of user without the permission of him is known as passive digital footprint.
For example- when user visits any website then website traces his physical location using user's device IP address **[2]**

OR

A licensing system is used to transparently relay decryption keys to the 'Reader' application and these keys are locked in authorized devices. It is vital that decryption keys are not exposed to users (i.e. passwords) and are locked in devices (so they will not work on other devices) otherwise they could be given to other users along with the protected content. **[2]**

24. Output

	First
One	1.0
Two	2.0
Three	NaN
Four	3.0

[2]

25.
```
import pandas as pd
data = {'First' : pd.Series(['One', 'Two'], index = [10, 20]),
'Second' : pd.Series(['One', 'Two', 'Three'], index = [10, 20, 30])}
val = pd.DataFrame (data)
print(val)
```

Output

	First	Second
10	One	One
20	Two	Two
30	NaN	Three

[2]

Commonly Made Error

- Some students do not use import statement for importing Pandas library which give error.

Answering Tip

- Import all required library to run the program

26. **(a)** SELECT SUM (PRICE) FROM ITEM WHERE PRODUCT_CODE = "PEN";
(b) SELECT PRODUCT_ID, QTY FROM ITEM WHERE PRICE < 15;
(c) SELECT * FROM ITEM WHERE QTY=1000; **[3]**

27. **(a)** will give the output as:
[30, 40, 90, 150, 30, 40, 90, 150]

(b) will give the output as

0	60
1	80
2	180
3	300

Justification: In the first statement x represents a list so when a list is multiplied by a number, it is

replicated that many number of times.

The second y represents a series. When a series is multiplied by a value, then each element of the series is multiplied by that number. **[3]**

28. Histogram can be drawn by using the dataframe.plot.hist( ) and series.plot.hist ( ) methods

```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
df4 = pd.DataFrame({ 'a': np.random.randn(1000) + 1,
'b': np.random.randn(1000),
'c': np.random.randn(1000) - 1},
columns =['a', 'b', 'c'])
plt.figure()
df4.plot.hist(alpha = 0.5)
```

[3]

29. When you are a victim of identity theft you need to do the following things to make its effect undone or minimize or to come out from it:

(i) If you come to know that your account is hacked and you still can login it then make appropriate changes as soon as possible so that the attacker could not login again and make it inaccessible for you.

(ii) Check all the information of your account they may be updated by the attacker. If it is so then correct them again.

(iii) If you are not able to login your account then contact the website's technical support service and inform them about the problem and try to fix that as soon as possible.

(iv) When you start accessing your account again then update all the login information so that account becomes inaccessible to the attacker.

(v) Also change the security question if it is provided by the website so that the account can't be hacked again easily.

(vi) Do not continue to use compromised password, PIN and other information.

(vii) Complain the relevant authority if any of document (PAN card, Driving license, bank passbook, passport, ATM, etc.) lost. **[3]**

OR

ICT possess tremendous emancipator potential to those who have access (and knowledge/ skills related to) to them; consequently, those lacking ICT access, knowledge and skills risk remaining trapped in a vicious downward spiral of disempowerment and alienation. It is important to emphasize that, while most traditional discussions of the Digital Divide focus primarily on the issue of equitable access to ICT and consequently on providing technologically disadvantaged populations with access to ICT tools and resources the issue of equitable ICT proficiency is actually far more crucial.

As Morino explains, the core concern is related to inequitable engagement and learning opportunities for technologically disadvantaged groups arising from a lack of meaningful opportunities to apply ICT effectively in an empowering and emancipator manner towards the achievement of meaningful educational and professional outcomes.

30. MAX ([DISTINCT] expr) returns the maximum value of expr. MAX () may take a string argument; in such cases, it returns the maximum string value. The DISTINCT keyword can be used to find the maximum of the distinct values of expr; however, this produces the same result as omitting DISTINCT. MAX () returns NULL if there are no matching rows.

e.g.

SELECT (Student_Name), MAX(Test_Score) FROM Student GROUP BY Student_Name; **[3]**

OR

(i) SELECT INSTR("Communication", "cat");

(ii) SELECT LEFT("Communication", 6);

(iii) SELECT LENGTH ("Communication");

31. **(i)** select cust_Name from customer where cust_city like '%a';

(ii)

Cust_Name	Open_Bal
Dhashmeh	10,000
Mrinal	12,000
Joe	13,000
Sanya	15,000
Ishaan	19,000

(iii) Select Cust_City, Max(Open_Bal) from Customer group by Cust_City;

(iv) Select count(*) from customer where open_bal between 15000 and 20000;

(v) select left(cust_name,2) from customer; **[5]**

OR

GROUP BY clause

GROUP BY clause is used do group rows, returned by SELECT statement into a specified rows or groups based on values of columns.

Syntax :

SELECT column 1, column 2, ..., Aggregate_ function(exp)
FROM Table_Name
GROUP BY Column_Name;
OR

SELECT column 1, column 2, ..., Aggregate_ function(exp)
FROM Table_Name
WHERE condition
GROUP BY Column_Name;

ORDER BY clause

ORDER BY clause is used to sort a result set, returned by a SELECT statement.

To sort a result set in ascending order, use ASC Keyword and in descending order, use DESC Keyword. The ORDER BY clause shorts the result set in ascending order by default.

Syntax :

SELECT column 1, column 2, ... FROM Table_Name
ORDER BY Column_Name <ASC/DESC>;

Having Clause

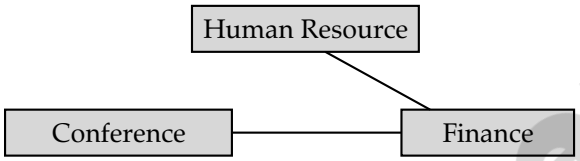
HAVING clause is often used with the GROUP BY clause in the SELECT statement to filter group of rows based on a specified condition.

Syntax:

SELECT column 1, column 2, ..., Aggregate_ function(Exp)
FROM Table_Name
GROUP BY Column_Name
HAVING condition;

32. **(i)** Finance block because it has maximum number of computers.

(ii)



(iii) Satellite link

(iv) Switch

(v) LAN **[5]**

33. The object supports both integer and label based indexing and provides a host of methods for performing operations involving the index.

In Python Pandas, Series.index attribute is used to get or set the index labels of the given series objects.

Syntax

Series.index

Pandas support three types of multi-axes indexing, which are as follows:

(i) .loc[] : This attribute is used to access a group of rows and columns by label (s) or a Boolean array in the given series object.

Syntax

Series.loc

(ii) .iloc[] : This attribute enables purely integer location based indexing for selection by position over the given series object.

Syntax

Series.iloc

(iii) .ix[] : This attribute is primarily label location based indexer, with integer position fallback. It takes the label as input and returns the value corresponding to that label.

Syntax

Series.ix **[5]**

OR

```
from matplotlib import pyplot as plt
Item = ['Food', 'Clothing', 'Education', 'Misc', 'Savings']
Amt = [2100, 600, 1200, 1500, 1000]
Space = [1, 1, 1, 1, 1]
icolor = ['green','blue', 'yellow', 'red', 'cyan']
plt.bar (Item, Amt, color = icolor, width = 2)
 plt.xlabel ('item')
plt.ylabel('Amt in Rs')
plt.title ('monthly budget')
plt.legend ( )
plt.show ( )
```

Commonly Made Error

- Some students are good in theory but not in programming, so they did mistake in coding.

Answering Tip

- Students should practice the program and coding practically so that their concepts could be clear.

34. **(i)** Safety **[1]**

(ii) Fin **[1]**

(iii) Output

18.0000

The MySQL avg() is an aggregate function used to return the average value of an expression in various records.

Syntax

```
SELECT AVG(aggregate_expression)
FROM tables
[WHERE conditions];
```

[1]

OR

Output

1

COUNT() function is used to returns the count of an expression. It allows us to count all rows or only some rows of the table that matches a specified condition. It is a type of aggregate function whose return type is BIGINT. This function return 0 if it does not find any matching rows.

35. **(i)** df['Name'][(df['Second']>=12) & (df['Second']<=20)] **[1]**

(ii) print(df.size) **[1]**

(iii) print(df.iloc[::-1])

DataFrame.iloc[] is a property that is used to select rows and columns by position/index. If the position/index does not exist, it gives an index error. **[2]**

OR

df.tail(3)

The tail() function is used to return the last *n* rows. This function returns last *n* rows from the object based on position

Commonly Made Error

- Some students get confused between Series and Dataframe and they write about Series instead of Dataframe.

Answering Tip

- Students should be clear all definition and their applications.

■■■

HINTS

Self Assessment Papers

Informatics Practices

Self Assessment Paper-1

2. Pandas Series is a one-dimensional labeled array capable of holding data of any type (integer, string, float, python objects, etc.).

19. Topology defines the structure of the network of how all the components are interconnected to each other.

20. The SUBSTR() function extracts a substring from a string (starting at any position).

33. A Data frame is a two-dimensional data structure, i.e., data is aligned in a tabular fashion in rows and columns.

Self Assessment Paper-2

21. GROUP BY clause is used in collaboration with the SELECT statement to arrange identical data into groups. This GROUP BY clause follows the WHERE clause in a SELECT statement and precedes the ORDER BY clause.

23. Intellectual property rights (IPR) refers to the legal rights given to the inventor or creator to protect his invention or creation for a certain period of time.

29. Cyberbullying is bullying with the use of digital technologies. It can take place on social media, messaging platforms, gaming platforms and mobile phones.

Self Assessment Paper-3

24. A Data frame is a two-dimensional data structure, i.e., data is aligned in a tabular fashion in rows and columns.

26. COUNT() function is used to returns the count of an expression. It allows us to count all rows or only some rows of the table that matches a specified condition.

29. Intellectual property rights (IPR) refers to the legal rights given to the inventor or creator to protect his invention or creation for a certain period of time.

Self Assessment Paper-4

21. GROUP BY clause is used in collaboration with the SELECT statement to arrange identical data into groups. This GROUP BY clause follows the WHERE clause in a SELECT statement and precedes the ORDER BY clause.

23. Data protection is the process of safeguarding important information from corruption, compromise or loss.

29. Intellectual property rights (IPR) refers to the legal rights given to the inventor or creator to protect his invention or creation for a certain period of time.

OR

A digital footprint is a unique data trace of a user's activities, actions, communications or transactions in digital media.

Self Assessment Paper-5

21. **(i)** The MID() function extracts a substring from a string (starting at any position).

23. Open source refers to something people can modify and share because its design is publicly accessible.

29. Data protection is the process of safeguarding important information from corruption, compromise or loss.

■■■

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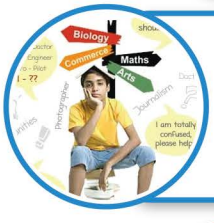

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