

# **Sample Question Paper - 1**

**(Issued by Board on 31<sup>st</sup> March, 2023)**

(2023-2024)

## **INFORMATICS PRACTICES**

Class-XII

## SOLVED

**Time Allowed : 3 hours**

**Maximum Marks : 70**

### **General Instructions :**

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

## **Section - A**

1. A \_\_\_\_\_ is a device that connects the organisation's network with the outside world of the Internet. 1  
(i) Hub (ii) Modem  
(iii) Gateway (iv) Repeater

2. When e-waste such as electronic circuit boards are burnt for disposal, the elements contained in them create a harmful chemical called \_\_\_\_\_ which causes skin diseases, allergies and an increased risk of lung cancer. 1  
(i) Hydrogen (ii) Beryllium  
(iii) Chlorine (iv) Oxygen

3. Copyright, Patent and Trademark comes under: 1  
(i) Intellectual Property Right (ii) Individual Property Right  
(iii) Industrial Property Right (iv) None of these

4. Predict the output of the following query: 1  
`SELECT MOD (9,0);`  
(i) 0 (ii) Null  
(iii) NaN (iv) 9

5. Which of the following SQL functions does not belong to the Math functions category? 1  
(i) POWER () (ii) ROUND ()  
(iii) LENGTH () (iv) MOD ()

6. \_\_\_\_\_ is not a FOSS tool. 1  
(i) Libre Office (ii) Mozilla Firefox  
(iii) Google Chrome (iv) Python

7. CSV stands for: 1  
(i) Column Separated Value (ii) Class Separated Value  
(iii) Comma Separated Value (iv) None of the above

- 8.** Raj, a Database Administrator, needs to display the average pay of workers from those departments which have more than five employees. He is experiencing a problem while running the following query. 1
- ```
SELECT DEPT, AVG(SAL) FROM EMP WHERE COUNT(*) > 5 GROUP BY DEPT;
```
- Which of the following is a correct query to perform the given task?
- SELECT DEPT, AVG(SAL) FROM EMP WHERE COUNT(\*) > 5 GROUP BY DEPT;
  - SELECT DEPT, AVG(SAL) FROM EMP HAVING COUNT(\*) > 5 GROUP BY DEPT;
  - SELECT DEPT, AVG(SAL) FROM EMP GROUP BY DEPT WHERE COUNT(\*) > 5;
  - SELECT DEPT, AVG(SAL) FROM EMP GROUP BY DEPT HAVING COUNT(\*) > 5;
- 9.** Predict the output of the following query. 1
- ```
SELECT LCASE (MONTHNAME ('2023-03-05'));
```
- |           |            |
|-----------|------------|
| (i) May   | (ii) March |
| (iii) may | (iv) march |
- 10.** Which of the following command will show the last 3 rows from a Pandas Series named NP? 1
- |                  |                       |
|------------------|-----------------------|
| (i) NP.Tail( )   | (ii) NP.tail(3)       |
| (iii) NP.TAIL(3) | (iv) All of the above |
- 11.** With reference to SQL, identify the invalid data type. 1
- |            |              |
|------------|--------------|
| (i) Date   | (ii) Integer |
| (iii) Year | (iv) Month   |
- 12.** In Python Pandas, while performing mathematical operations on series, index matching is implemented and all missing values are filled in with \_\_\_\_\_ by default. 1
- |           |            |
|-----------|------------|
| (i) Null  | (ii) Blank |
| (iii) Nan | (iv) Zero  |
- 13.** By restricting the server and encrypting the data, a software company's server is unethically accessed in order to obtain sensitive information. The attacker blackmails the company to pay money for getting access to the data, and threatens to publish sensitive information unless price is paid. This kind of attack is known as: 1
- |                  |                     |
|------------------|---------------------|
| (i) Phishing     | (ii) Identity Theft |
| (iii) Plagiarism | (iv) Ransomware     |
- 14.** In SQL, the equivalent of UCASE() is: 1
- |                 |                    |
|-----------------|--------------------|
| (i) UPPERCASE() | (ii) CAPITALCASE() |
| (iii) UPPER()   | (iv) TITLE()       |
- 15.** Collection of hyper linked documents available on the internet is known as \_\_\_\_\_. 1
- |                  |                  |
|------------------|------------------|
| (i) Website      | (ii) Webpage     |
| (iii) Web Server | (iv) Web Hosting |
- 16.** \_\_\_\_\_ is a non-profit organization that aims to build a publicly accessible global platform where a range of creative and academic work is shared freely. 1
- |                        |                       |
|------------------------|-----------------------|
| (i) Creative Cost      | (ii) Critical Commons |
| (iii) Creative Commons | (iv) Creative Common  |
- 17.** **Assertion (A):** MODEM stands for modulator-demodulator. 1  
**Reason (R):** It is a computer hardware device that converts data from a digital format to analog and vice versa.
- |  |
|--|
| (i) Both (A) and (R) are true and (R) is the correct explanation of (A)      |
| (ii) Both (A) and (R) are true but (R) is not the correct explanation of (A) |
| (iii) (A) is true, but (R) is false  |
| (iv) (A) is false, but (R) is true   |
- 18.** **Assertion (A):** To use the Pandas library in a Python program, one must import it. 1  
**Reason (R):** The only alias name that can be used with the Pandas library is pd.
- |  |
|--|
| (i) Both (A) and (R) are true and (R) is the correct explanation of (A)      |
| (ii) Both (A) and (R) are true but (R) is not the correct explanation of (A) |
| (iii) (A) is true, but (R) is false  |
| (iv) (A) is false, but (R) is true   |

## Section – B

- 19.** Briefly explain the basic concepts of a web server and web hosting. 2

**OR**

Rati is doing a course in networking. She is unable to understand the concept of URL. Help her by explaining it with the help of suitable example.

- 20.** The python code written below has syntactical errors. Rewrite the correct code and underline the corrections made. 2

```
Import pandas as pd
df = {"Technology": ["Programming", "Robotics", "3D Printing"], "Time(in
months)": [4, 4, 3]}
df= pd.dataframe(df)
Print(df)
```

- 21.** Consider the given SQL string: 2

"12#All the Best!"

Write suitable SQL queries for the following:

- (i) Returns the position of the first occurrence of the substring "the" in the given string. 2
- (ii) To extract last five characters from the string.

- 22.** Predict the output of the given Python code: 2

```
import pandas as pd
list1=[-10,-20,-30]
ser = pd.Series(list1*2)
print(ser)
```

- 23.** Differentiate between the active digital footprint and passive digital footprints. 2

- 24.** Complete the given Python code to get the required output as: Rajasthan 2

```
import as pd
di = {'Corbett': 'Uttarakhand', 'Sariska': 'Rajasthan', 'Kanha': 'Madhya Pradesh',
'Gir': 'Gujarat'}
NP = _____. Series( ____ )
print(NP[ ____ ])
```

- 25.** What are aggregate functions in SQL? Name any two. 2

## Section – C

- 26.** Based on the SQL table CAR\_SALES, write suitable queries for the following: 3

NUMBER	SEGMENT	FUEL	QT1	QT2
1.	Compact HatchBack	Petrol	56000	70000
2.	Compact HatchBack	Diesel	34000	40000
3.	MUV	Petrol	33000	35000
4.	MUV	Diesel	14000	15000
5.	SUV	Petrol	27000	54000
6.	SUV	Diesel	18000	30000
7.	Sedan	Petrol	8000	10000
8.	Sedan	Diesel	1000	5000

- (i) Display fuel wise average sales in the first quarter.
- (ii) Display segment wise highest sales in the second quarter.
- (iii) Display the records in the descending order of sales in the second quarter.

**OR**

Predict the output of the following queries based on the table CAR\_SALES given above:

- (i) `SELECT LEFT(SEGMENT, 2) FROM CAR_SALES WHERE FUEL= "PETROL";`
- (ii) `SELECT (QT2-QT1)/2 "AVG SALE" FROM CAR_SALES WHERE SEGMENT= "SUV";`
- (iii) `SELECT SUM(QT1) "TOT SALE" FROM CAR_SALES WHERE FUEL= "DIESEL";`

**27.** Create a DataFrame in Python from the given list:

3

```
[['Divya','HR',95000],['Mamta','Marketing',97000],['Payal','IT',980000],
[Deepak,'Sales',79000]]
```

Also give appropriate column headings as shown below:

	Name	Department	Salary
0	Divya	HR	95000
1	Mamta	Marketing	97000
2	Payal	IT	980000
3	Deepak	Sales	79000

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

3

- (i) To create a database named FOOD.
- (ii) To create a table named Nutrients based on the following specification:

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

**29.** Richa, recently started using her social media account. Within a few days, she befriends many people she knows and some that she does not know. After some time, she starts getting negative comments on her posts. She also finds that her pictures are being shared online without her permission.

3

Based on the given information, answer the questions given below.

- (i) Identify the type of cybercrime she is a victim of.
- (ii) Under which act, she can lodge a complaint to the relevant authorities?
- (iii) Suggest her any two precautionary measures which she should take in future while being online to avoid any such situations.

OR

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

**30.** Consider the given Data Frame 'Genre':

3

	Type	Code
0	Fiction	F
1	Non Fiction	NF
2	Drama	D
3	Poetry	P

Write suitable Python statements for the following:

- (i) Add a column called Num\_Copies with the following data: [300,290,450,760].
- (ii) Add a new genre of type 'Folk Tale' having code as "FT" and 600 number of copies.
- (iii) Rename the column 'Code' to 'Book\_Code'.

## Section – D

- 31.** Preeti manages database in a blockchain start-up. For business purposes, she created a table named BLOCKCHAIN. Assist her by writing the following queries:

**TABLE: BLOCKCHAIN**

ID	User	Value	Hash	Transaction Date
1.	Steve	900	ERTYU	2020-09-19
2.	Meesha	145	@345r	2021-03-23
3.	Nimisha	567	#wert5	2020-05-06
4.	Pihu	678	%rtyu	2022-07-13
5.	Kopal	768	rrt4%	2021-05-15
6.	Palakshi	534	wer@3	2022-11-29

- (i) Write a query to display the year of oldest transaction.
- (ii) Write a query to display the month of most recent transaction.
- (iii) Write a query to display all the transactions done in the month of May.
- (iv) Write a query to count total number of transactions in the year 2022.

- 32.** Ekam, a Data Analyst with a multinational brand has designed the DataFrame df that contains the four quarter's sales data of different stores as shown below:

Answer the following questions:

	Store	Qtr 1	Qtr 2	Qtr 3	Qtr 4
0	Store 1	300	240	450	230
1	Store 2	250	340	403	210
2	Store 3	250	180	180	160

- (i) Predict the output of the following python statement:
  - a. `print(df.size)`
  - b. `print(df[1:3])`
- (ii) Delete the last row from the DataFrame.
- (iii) Write Python statement to add a new column `Total_Sales` which is the addition of all the 4 quarter sales.

**OR**

(Option for part iii only)

Write Python statement to export the Data Frame to a CSV file named data.csv stored at D: drive.

## Section – E

- 33.** Write suitable SQL queries for the following:

- (i) To calculate the exponent for 3 raised to the power of 4.
- (ii) To display current date and time.
- (iii) To round off the value -34.4567 to 2 decimal place.
- (iv) To remove all the probable leading and trailing spaces from the column `userid` of the table named `user`.
- (v) To display the length of the string 'FIFA World Cup'.

**OR**

Kabir has created following table named exam:

Reg No	Name	Subject	Marks
1	Sanya	Computer Science	98
2	Sanchay	IP	100
3	Vinesh	CS	90
4	Sneha	IP	99
5	Akshita	IP	100

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

- (i) Insert a new record in the table having following values: [6,'Khushi','CS',85]
- (ii) To change the value "IP" to "Informatics Practices" in subject column.

(iii) To remove the records of those students whose marks are less than 30.

(iv) To add a new column **Grade** of suitable data type.

(v) To display records of "Informatics Practices" subject.

- 34.** XYZ Media house campus is in Delhi and has 4 blocks named Z1, Z2, Z3 and Z4. The tables given below show the distance between different blocks and the number of computers in each block. 5

Block Z1 to Block Z2	80 metres
Block Z1 to Block Z3	65 metres
Block Z1 to Block Z4	90 metres
Block Z2 to Block Z3	45 metres
Block Z2 to Block Z4	120 metres
Block Z3 to Block Z4	60 metres

Block	Number of computers
Z1	135
Z2	290
Z3	180
Z4	195

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

- (i) Out of the four blocks on campus, suggest the location of the server that will provide the best connectivity. Explain your response.
- (ii) For very fast and efficient connections between various blocks within the campus, suggest a suitable topology and draw the same.
- (iii) Suggest the placement of the following devices with justification
  - (a) Repeater
  - (b) Hub/Switch
- (iv) VoIP technology is to be used which allows one to make voice calls using a broadband internet connection. Expand the term VoIP.
- (v) The XYZ Media House intends to link its Mumbai and Delhi centres. Out of LAN, MAN, or WAN, what kind of network will be created? Justify your answer.

- 35.** The heights of 10 students of eighth grade are given below:

Height cms=[145, 141, 142, 142, 143, 144, 141, 140, 143, 144]

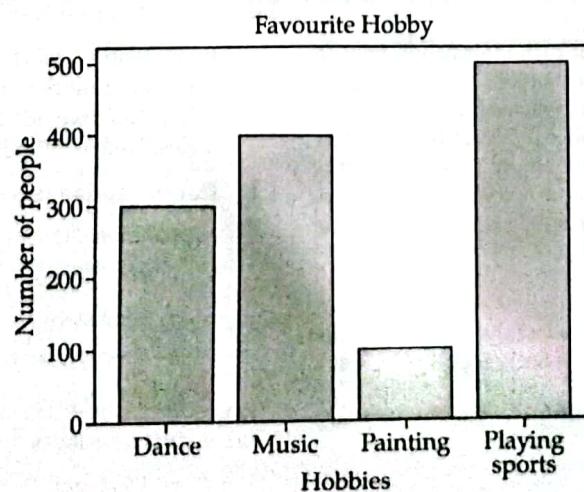
5

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

Also give suitable python statement to save this chart.

OR

Write suitable Python code to create 'Favourite Hobby' Bar Chart as shown below:



Also give suitable python statement to save this chart.



# ANSWERS

## Sample Question Paper - 1

Marking Scheme 2023-24 (Issued by Board)

### Informatics Practices

#### Section – A

##### 1. Correct option is (iii)

**Explanation:** A gateway is a device that connects two dissimilar networks. It is actually a node on in a network that serves as an entrance to another network. In enterprises, it acts as a proxy server, a firewall to prevent unauthorized access to and from the private network, a router which uses headers and forwarding tables and a switch which provides path for the movement of the packets in and out of the gateway.

##### 2. Correct option is (ii)

**Explanation:** Electrical and electronic equipments contain metallic and non-metallic elements, alloys and compounds. When these equipment reach the end of their lifecycle these are generally either dumped into landfills or burnt. When dumped into land fill, chemical components of these equipment pollute the soil. When burnt many of these substances produce harmful gases. Beryllium is also released as it has very high melting point and it also doesn't get oxidized.

##### 3. Correct option is (i)

**Explanation:** Any form of creation be it music, art, painting, sculpture, poem, article or any other creative piece such as a software, an interface etc which is a result of someone's hard work and intellect is that individual's intellectual property. Any unauthorized access and use of such piece of creation is a violation to the intellectual property rights. Many laws and regulations have been enforced to check such violations. Copyright, patent and trademark are some such regulations.

Copyright gives the owner of such information right to decide the extent of use of his creation.

Patent grants an inventor sole rights to his invention.

Trademark is a sign or symbol representing a product or service that distinguishes it clearly from others. It is used to identify that product or service. Thus it makes its owner stand out from others and hence safeguards the intellectual property.

##### 4. Correct option is (ii)

**Explanation:** Mod() is used to find the remainder of the division of two numbers. Its syntax is MOD(x,y) when x is divided by y.

Here 9 is being divided by 0 which is not possible hence the answer will be Null.

##### 5. Correct option is (iii)

**Explanation:** power() calculates power of a number i.e.  $x^y$ .

Round() is used to round off a value.

Mod() is used to find the remainder of a division. i.e. remainder of a/b.

Length() is used to find length of a field or string. It doesn't involve any arithmetical operation or numeric operand, hence it is not a mathematical function.

##### 6. Correct option is (iii)

**Explanation:** FOSS stands for Free and Open Source Software. It refers a software which is both free and open source. Mozilla Firefox, Libre office and Python are free and open source, google chrome is also free but not open source.

##### 7. Correct option is (iii)

**Explanation:** CSV text files are delimited text files that contain individual data separated by a comma.

##### 8. Correct option is (iv)

**Explanation:** WHERE clause is used to put condition on individual rows and HAVING clause is used to put condition on groups. Here we need to put condition on groups of departments so first we will form groups and then use the HAVING clause.

##### 9. Correct option is (iv)

**Explanation:** MONTHNAME() will give the month of the given argument i.e. March. Now the LCASE() function will convert this to lowercase i.e. march.

##### 10. Correct option is (ii)

**Explanation:** tail() function is used to extract specified number of elements from the end of a series. Here we need to extract last three rows of NP series. Hence NPtail(3).

##### 11. Correct option is (iv)

**Explanation:** SQL provides following datatypes

- STRING Types
  - CHAR(size)
  - VARCHAR(size)
  - TEXT(size)
- Numeric Types
  - INT(size)
  - FLOAT(size,d)
  - DEC

- DATE and TIME types
  - DATE()
  - TIME()
  - YEAR()

**12. Correct option is (iii)**

**Explanation:** When mathematical operations are performed on a Pandas Series, the operations are performed only on the matching indexes. The non available values are filled with NaN(Not a Number).

**13. Correct option is (iv)**

**Explanation:** All these are types of cybercrime. **Phishing** refers to an attempt by the cyber criminals to pose as a legitimate or trustworthy source and make the user give in his /her personal information. **Identity theft** refers to an attack in which the criminal uses someone's personal information such as name, login credentials, credit card details to pose as that person online for personal gains. **Plagiarism** refers to the act of using someone's work, idea or words and present them as one's own. **Ransomware** refers to the cyber attack when criminals gain access to a system and captivate important files and data. In such cases the users of the system loose access to the data and have to pay the amount demanded by the attacker in lieu of getting back the access.

**14. Correct option is (iii)**

**Explanation:** UCASE() in SQL is used to convert a string to upper case. UPPER() also converts a string to uppercase.

**15. Correct option is (i)**

**Explanation:** A website is a collection of electronic documents linked with each other through hyperlinks.

**16. Correct option is (iii)**

**Explanation:** Creative Commons (CC) is an internationally active non-profit organisation that provides free licences for creators to use when making their work available to the public. These licences help the creator to give permission for others to use the work in advance under certain conditions.

**17. Correct option is (i)**

**Explanation:** when digital data is transmitted over telephone lines it needs to be converted to analog signals (Modulation). Similarly at the receiving end the analog data received must be converted back to the digital form to be used with digital devices(Demodulation). For this purpose a special device is used. This device is called MODEM as it modulates as well as demodulates the data.

**18. Correct option is (iii)**

**Explanation:** To use Pandas library in a Python program it needs to be imported. A library in Python can be imported using import statement, the syntax for which is `import <library name> as <alias>`. This alias name can be any valid identifier. Therefore when Pandas library is imported any alias name can be used.

**19.**

**Web server:** A web server is used to store and deliver the contents of a website to clients such as a browser that request it. A web server can be software or hardware. **2 Web hosting:** It is a service that allows to put a website or a web page onto the Internet, and make it a part of the World Wide Web.

(1 mark each for each correct explanation)

**OR**

**URL:** It stands for Uniform Resource Locator. It provides the location and mechanism (protocol) to access the resources over the internet.

**URL** is sometimes also called a web address. It not only contains the domain name, but other information as well that completes a web address.

**Examples:**

`https://www.cbse.nic.in`, `https://www.mhrd.gov.in`, `http://www.ncert.nic.in`, `http://www.airindia.in`, etc.

(1 mark for correct explanation)

(1 mark for correct example)

**Detailed Answer:**

**Explanation:** Web Server- Internet operates on Client Server architecture. In this type of architecture there is a host that provides services to its clients. In WWW any computer that stores the web pages or documents, that can be requested by a client are known as Web servers or Web hosts. The service that these computers provide is known as web hosting.

**OR**

Every web site on the WWW has a unique address called URL. A typical URL is of the form: type://address/path. Here type is the type of the server on which the file or the page is located, address is the address of the server or the host and path is the location of the file on the server.

In the given examples `https://www.cbse.nic.in` https specifies that the server is a http server, www.cbse.nic.in is the domain or address of the web server.

**20.**

```
import pandas as pd 2
df=[{"Technology":["Programming","Robotics","3D
Printing"],"Time(in months)":[4,4,3]}
df=pd.DataFrame(df)
print(df)
```

(½ mark for each correction)

**Detailed Answer:**

**Explanation:** Python is a case sensitive language so uppercase and lowercase letters are treated differently. import, print and DataFrame are keywords. Using Import, Print and dataframe in place of import, print and DataFrame respectively will give errors.

**21.**

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

**Detailed Answer:**

**Explanation:** (i) `INSTR(str, substr)` returns the first occurrence of 'substr' in 'str'.  
(ii) `RIGHT(str, n)` returns n characters from the right of the 'str'.

**22.**

- 0 -10  
1 -20  
2 -30  
3 -10  
4 -20  
5 -30

2

(2 marks for correct output)

**Detailed Answer:**

**Explanation:** \* operator in Python when used with any series data type, works as replicator. i.e it repeats that series the specified number of times. `<Series>*n` will repeat the `<series>` n times. Here the list `list1` will be repeated 2 times and then converted into a Pandas Series using `Series()` function.

**23.**

**Active Digital Footprints:** Active digital footprints include data that we intentionally submit online. This would include emails we write, or responses or posts we make on different websites or mobile Apps, etc. 2

**Passive Digital Footprints:** The digital data trail we leave online unintentionally is called passive digital footprints. This includes the data generated when we visit a website, use a mobile App, browse Internet, etc.

(2 marks for correct differentiation)

**Detailed Answer:**

**Explanation:** Any activity that we do online leaves some marks. This activity may be in the form of comment, posting a picture, browsing history etc. these marks are known as digital footprints and can be of two types Active digital footprints and passive digital footprints. The comments or posts or mails are our intentional activities and leave an active digital footprint whereas when we browse the internet, visit a web site or use a mobile app, although the activities are intentional but the data that is collected by these sites and apps is hidden from us. So this leaves a passive digital footprint.

**24.**

```
import pandas as pd
di = {'Corbett': 'Uttarakhand', 'Sariska': 'Rajasthan',
'Kanha': 'Madhya Pradesh', 'Gir': 'Gujarat'}
NP = pd.Series(di)
print(NP['Sariska'])
```

(½ mark for each correct fill-up)

**Detailed Answer:**

**Explanation:** This code creates a Pandas series so we need to import the pandas library first. Now to create a series from a dictionary the syntax is  
`<series name> = <pandas alias>. Series (<dictionary_name>)`

To get the value stored at a particular index in a series the index name is to be specified along with the series name. The syntax is `<Series_name>[<index>]`

**25.**

**Aggregate functions:** These are also called multiple row functions. These functions work on a set of records as a whole, and return a single value for each column of the records on which the function is applied.

`Max()`, `Min()`, `Avg()`, `Sum()`, `Count()` and `Count(*)` are few examples of multiple row functions.

(1 mark for correct explanation)

(½ mark each for two correct names)

**Detailed Answer:**

**Explanation:** Functions that return single values from groups of values are called aggregate functions. These are used to calculate summary values from a column of all the rows of a table or a subset of rows. These can be applied in general to any numeric values and some CHAR and DATE values. The table can be divided into groups using GROUP BY clause.

## Section – C

**26.**

- (i) `SELECT FUEL, AVG(QT1) FROM CAR_SALES GROUP BY FUEL;` 3  
(ii) `SELECT SEGMENT, MAX(QT2) FROM CAR_SALES GROUP BY SEGMENT;`  
(iii) `SELECT * FROM CAR_SALES ORDER BY QT2 DESC;`

(1 mark for each correct query)

OR

- (i) `LEFT(SEGMENT,2)`  
Co  
MU  
SU  
Se  
(ii) `AVG SALE`  
13500.0000  
6000.0000  
(iii) `TOT SALE`  
67000

(1 mark each correct output)

**Detailed Answer:**

**Explanation:** (i) In this query average sales for Quarter 1 are to be displayed based on each fuel type. So the data is grouped according to Fuel and then average sales is calculated using average function.

(ii) Here the data is to be grouped according to the segment so 'GROUP BY Segment' clause is used and to find the highest sales in the second quarter `max(QT2)` clause is used.

(iii) In this query data is to be displayed in descending order of sales of quarter 2 so 'ORDER BY QT2'

clause is used .To display in descending order DESC clause is used.

**OR**

- EFT() function is used to extract specified number of letters from CHAR or VARCHAR types of data. Here'LEFT(SEGMENT,2)' will extract 2 characters from the left of the column 'SEGMENT' for the rows where fuel type is "Petrol".
- This query displays the half of the difference of sales of quarter 2 and quarter1 for the SEGMENT 'SUV'. The heading of the output is displayed as "AVG SALE"(alias name given to the value obtained) as specified in the SELECT clause.
- This query displays the total sales for Quarter1 for the vehicles of FUEL type 'DIESEL'. The alias given to the output is "TOT SALE".

**27.**

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

**Detailed Answer:**

**Explanation:** Statement 1 is used to import the PANDAS library with alias pd.

# statement2 creates a nested list for the given data.  
# statement 3 creates a dataframe df using function DataFrame.

Syntax of DataFrame() function is <dataframe object> = pandas.DataFrame(<a 2D datastructure>, [columns = <column sequence>], [index = <index sequence>])  
# statement4 prints the dataframe.

**28.**

- CREATE DATABASE FOOD; 3  
(1 mark for correct answer)
- CREATE TABLE NUTRIENTS  
(NAME VARCHAR(20)  
PRIMARY KEY,CALORIES INTEGER); ½ mark for CREATE TABLE NUTRIENTS  
½ mark each for correctly specifying each column  
½ mark for correctly specifying primary key)

**Detailed Answer:**

**Explanation:** (i) To create a database CREATE DATABASE command is used.

(ii) To create a table CREATE TABLE <table name> command is used. To create a table its columns and their data types are to be specified. Also any

constraints that need to be applied to the table should also be specified with this command. Before using create table command its parent data base should be opened.

**29.**

- She is a victim of Cyber Bullying. 3  
Information Technology Act, 2000  
(also known as IT Act).
- a Need to be careful while befriending unknown people on the internet.  
b Never share personal credentials like username and password with others.

(1 mark for each correct answer)

**OR**

Simran needs to be made aware of the following consequences:

- Eye strain
- Painful muscles and joints
- Poor memory
- Lack of sleep
- Back pain and neck pain

(1 mark each for writing any 3 correct health hazards)

**Detailed Answer:**

**Explanation:** (i) When technology such as internet, social media etc is used to embarrass, harass, defame or demean someone it is known as Cyber bullying and must be reported to either parents, elders and in more serious cases to the Police.

- Cyber laws in India are enforced through Information Technology Act 2000, based on the United Nation's commission for International Trade related laws.
- To avoid Cyber Bullying we should follow some precautions such as:
  - Never share our passwords with anyone.
  - Never befriend any unknown person.
  - Never share your personal details with anyone.
  - Never share your location details with anyone.
  - Report any such incident immediately to your elders or some one you trust. They will help you come out of this.
  - If it doesn't stop report to police or cyber cell.

**OR**

Health hazards of excessive use of technology and gadgets:

- Vision problems - Bright light and bad glare or flickering image can strain your eyes.
- Headache- Because of increased muscle tension or pain in the neck at the base of the skull, headache is common problem with computer use.
- Stress disorders- Prolonged computer use along with other factors like poor health, work pressure and job environment can make you susceptible to stress. Moreover, the longer you uphold the stress, the more susceptible you become to other health issues.

**30.**

- (i) `Genre["Num_Copies"]=[300,290,450,760]` 3  
 (ii) `Genre.loc[4]=["Folk Tale","FT",600]`  
 (iii) `Genre=Genre.rename({"Code":"Book_Code"}, axis=1)`

**OR**

```
Genre=Genre.rename({"Code":"Book_Code"}, axis="columns")
```

(1 mark for each correct statement)

**Detailed Answer:**

**Explanation:** (i) To add a column to an existing dataframe , the values of each row of that column are provided in the form of a list. The syntax is: <dataframe object>[<column name>] = <list of values>

(ii) To add a row to an existing dataframe following syntax is used.

$$<\text{DF object}>[\langle\text{row name}\rangle,:]=\langle\text{new value}\rangle$$
**OR**

$$<\text{DF object}>.\text{loc}[\langle\text{row name}\rangle,:]=\langle\text{new value}\rangle$$

(iii) To rename any axis of a dataframe the syntax is  
`<dataframe object> = <dataframe object>.rename({<oldname>:<newname>, [...], axis = <axis name>})`

## Section – D

**31.**

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

**Detailed Answer:**

**Explanation:** (i) The older dates in sql are treated to be smaller than the new one. So to get the date of oldest transaction min() function is used.

(ii) To select the most recent transaction date max() function is used. Month() returns the month from a date. So max() function is nested within the month() to get the month of the most recent transaction.

(iii) monthname() function returns the name of the month from a date. To get the transactions done in the month of MAY, monthname() function is used in WHERE clause.

(iv) count() function is used to count the number of records. Here we need to count the transactions in the year 2022 so in WHERE clause year() function is used to get the year of the transaction date.

**32.**

- (i) a. 15  
 b. Store Qtr1 Qtr2 Qtr3 Qtr4  
 1 Store2 350 340 403 210  
 2 Store3 250 180 145 160

- (ii) `df=df.drop(2)`

**OR**

$$\text{df.drop}(2,\text{axis}=0)$$

$$\text{(iii) df["total"] = df["Qtr1"] + df["Qtr2"] + df["Qtr3"] + df["Qtr 4"]}$$
**OR**

$$\text{df.to\_csv("D:\data.csv")}$$

(1 mark for each correct output/statement)

**Detailed Answer:**

**Explanation:** (i) (a) Size is an attribute of dataframe objects that returns an int representing the number of elements of this object. Which is 15 here.

(b) Slicing is the method to extract a subset from a dataframe. The syntax for slicing is <dataframe object>[start row index :end row index]

The rows from 'start row index' till 'end row index' excluding the row at 'end row index' are extracted from the dataframe.

(ii) The syntax to delete a row or column is <dataframe object>.drop(<row/column> index>, axis). This will delete the specified row/column depending upon the axis (0 for row and 1 for column).

**OR**

$$<\text{dataframe object}>=\text{<dataframe object>.drop(<\text{rowindex}>)}$$

This will return a dataframe object after deleting a row from the dataframe.

(iii) To add a new column syntax is:

$$<\text{dataframe object}>[\langle\text{column name}\rangle] = \langle\text{list of values}\rangle$$

Now to add sales of all the four quarters  $\text{df}["qtr1"] + \text{df}["qtr2"] + \text{df}["qtr3"] + \text{df}["qtr4"]$  is used.

$\text{df}["qtr1"]$  accesses the value at qtr1 of a row. Similarly for other quarters. All the values are added to get the total sales and the result is inserted in the new column.

**OR**

$$\text{df.to\_csv("D:\data.csv")}$$

## Section – E

**33.**

- (i) `SELECT POWER(3,4);`  
 (ii) `SELECT NOW();`  
 (iii) `SELECT ROUND(-34.4567,2);`  
 (iv) `SELECT TRIM(USERID) FROM USER;`  
 (v) `SELECT LENGTH("FIFA World Cup");`

(1 mark for each correct query)

OR

- (i) **INSERT INTO EXAM VALUES(6,'Khushi','CS',85);**
- (ii) **UPDATE EXAM SET subject= "Informatics Practices" where subject = "IP";**
- (iii) **DELETE FROM EXAM WHERE marks<30;**
- (iv) **ALTER TABLE EXAM ADD COLUMN grade varchar(2);**
- (v) **Select \* from exam where subject="Informatics Practices";**

(1 mark for each correct query)

**Detailed Answer:**

**Explanation:** (i) Power() function is used to calculate the value of base raised to the power. Syntax: Power(base, power)

(ii) now() function returns the current date and time. It takes no arguments.

(iii) round() function is used to round off a number to specified number of decimal places.

**Syntax :** round(number, decimal places)

(iv) trim() function is used to remove all the leading and trailing blank spaces from a string.

Ltrim() function truncates the leading blank spaces and rtrim() function truncates the trailing blank spaces.

(v) length() function returns the length of a string.

OR

- (i) to insert a new record in table 'Insert Into' command is used.

**Syntax:** INSERT INTO <table name> VALUES (<value of each column separated by comma>) This is a DML command.

- (ii) to update values in a table UPDATE command is used.

**Syntax:** UPDATE <table name> SET <column name> = <value> Where <condition> This is a DML command.

- (iii) to delete rows from a table DELETE command is used.

**Syntax:** DELETE FROM <table name> WHERE <condition> This is a DML command.

- (iv) To add a new column we need to change the structure of the table. For this ALTER TABLE command is used with ADD.

**Syntax:** ALTER TABLE <table name> ADD <column name><data type>< constraints>

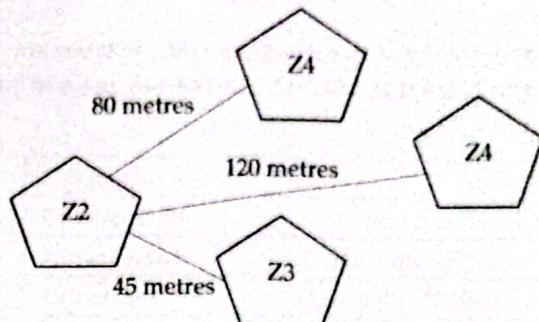
This is a DDL command.

- (v) To display records SELECT command is used.

**Syntax :** SELECT <column1>, <column2>,... FROM <table name> WHERE <condition>

**34.**

- (i) Z2 as it has maximum number of computers.
- (ii) For very fast and efficient connections between various blocks within the campus suitable topology: Star Topology



- (iii) Repeater: To be placed between Block Z2 to Z4 as distance between them is more than 100 metres.

Hub/Switch: To be placed in each block as each block has many computers that needs to be included to form a network.

- (iv) Voice Over Internet Protocol

- (v) WAN as distance between Delhi and Mumbai is more than 40kms.

(1 mark for each correct answer)

**Detailed Answer:**

**Explanation:** (i) The block with maximum number of computers is elected to install the server so that the minimum number of systems are at a larger distance and the connectivity is better.

(ii) In star topology all the nodes are connected to a central computer directly, therefore the transmission is very fast and effective.

(iii) A repeater is a device that amplifies a signal being transmitted. It is used in long network lines where data is to be transmitted to a distance greater than that rated.

A hub is used to connect several computers together while a switch is used to divide the network into sub segments and is responsible for forwarding data packets. These devices are placed at every location where we need to segment the network. Here it is placed in each block to divide network into different sub-networks at each block level.

(iv) VoIP is the protocol used to establish a connection and transfer data in the form of audio signals over internet just as in a phone call. This technology is used to make voice calls over internet. VoIP is : Voice over internet protocol.

- (v) LAN network is suited for connections within a building or small premises.
- MAN networks are formed for connectivity within the bounds of a city.
- WAN networks connect devices across cities, countries and continents.

35.

```
Import matplotlib.pyplot as plt #Statement 1
Height_cms=[145,141,142,142,143,143,141,140,143,
```

144] 5

	#Statement 2
plt.hist(Height_cms)	#Statement 3
plt.title("Height Chart")	#Statement 4
plt.xlabel("Height in cms")	#Statement 5
plt.ylabel("Number of people")	#Statement 6
plt.show()	#Statement 7

(½ mark each for each correct statement 1,2,4,5,6,7)  
 (1 mark for correct statement 3) plt.savefig("heights.jpg")  
 (1 mark for the correct statement)

OR

import matplotlib.pyplot as plt	#Statement 1
hobby = ('Dance', 'Music', 'Painting', 'Playing Sports')	#Statement 2
users = [300,400,100,500]	#Statement 3
plt.bar(hobby, users)	#Statement 4
plt.title("Favourite Hobby")	#Statement 5
plt.ylabel("Number of people")	#Statement 6
plt.xlabel("Hobbies")	#Statement 7
plt.show()	#Statement 8

plt.savefig("hobbies.jpg")

(½ mark for each correct statement)  
 (1 mark for the correct statement)

## Detailed Answer:

**Explanation:** Pyplot interface of Matplotlib library is used in Python for data visualization. (# statement 1)

The data to be plotted is taken as a list. (# statement 2)

To plot a histogram hist() function is used. It takes data series as argument. (# statement 3)

To give title to the plot title() function of pyplot is used. (# statement 4)

To give label to x axes xlabel() function of pyplot is used. (# statement 5)

To give label to y axes ylabel() function of pyplot is used. (# statement 6)

To display the plot show() function of pyplot is used. (# statement 7)

To save the chart savefig() function of pyplot is used. Its syntax is <pyplot alias>. savefig(<file name>)

OR

Pyplot interface of Matplotlib library is used in Python for data visualization. (# statement 1)

The data to be plotted on x axis is taken as the tuple 'hobby'. (# statement 2)

The data to be plotted on y axis is taken as the list 'users'. (# statement 3)

To plot a bar chart bar() function is used. It takes two data series as argument. First is the data to be plotted on x-axis and second is the data to be plotted on y axis. (# statement 4)

To give title to the plot title() function of pyplot is used. (# statement 5)

To give label to y axes ylabel() function of pyplot is used. (# statement 6)

To give label to x axes xlabel() function of pyplot is used. (# statement 7)

To display the plot show() function of pyplot is used. (# statement 8)

To save the chart savefig() function of pyplot is used. Its syntax is <pyplot alias>. savefig(<file name>)