SAMPLE QUESTION PAPER (THEORY)
CLASS XII
INFORMATICS PRACTICES (065)

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

General Instructions:

1. Please check this question paper contains 37 questions.
2. All questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
3. The paper is divided into 5 Sections- A, B, C, D and E.
4. Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
5. Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
6. Section C consists of 4 questions (29 to 32). Each question carries 3 Marks.
7. Section D consists of 2 case study type questions (33 to 34). Each question carries 4 Marks.
8. Section E consists of 3 questions (35 to 37). Each question carries 5 Marks.
9. All programming questions are to be answered using Python Language only.
10. In case of MCQ, text of the correct answer should also be written.

Section A

1. State whether the following statement is True or False: [1]
Slicing can be used to extract a specific portion from a Pandas Series.

Ans. True

2. The purpose of `WHERE` clause in a SQL statement is to: [1]

(a) Create a table (b) Filter rows based on a specific condition
(c) Specify the columns to be displayed (d) Sort the result based on a column

Ans. (b) Filter rows based on a specific condition

3. Identify the networking device responsible for routing data packets based on their destination addresses. [1]

(a) Modem (b) Hub
(c) Repeater (d) Router

Ans. (d) Router

4. Identify the SQL command used to delete a relation (table) from a relational database. [1]

(a) DROP TABLE (b) REMOVE TABLE
(c) DELETE TABLE (d) ERASE TABLE

Ans. (a) DROP TABLE

5. e-waste refers to: [1]

(a) Software that has become obsolete (b) Data that has been deleted from a storage device
(c) Viruses that infect computers (d) Electronic devices that are no longer in use

Ans. (d) Electronic devices that are no longer in use

6. Which of the following Python statements can be used to select a column `column_name` from a DataFrame `df` ? [1]

(a) `df.getcolumn('column_name')` (b) `df['column_name']`
(c) `df.select('column_name')` (d) `df(column_name)`

Ans. (b) `df['column_name']`

7. By default, the plot() function of Matplotlib draws a _____ plot. [1]

(a) histogram (b) column
(c) bar (d) line

Ans. (d) line

8. State whether the following statement is True or False: [1]
In SQL, the `HAVING` clause is used to apply filter on groups formed by the `GROUP BY` clause.

Ans. True

9. Which of the following Python statements is used to import data from a CSV file into a Pandas DataFrame? (Note: pd is an alias for pandas) [1]

(a) `pd.open_csv('filename.csv')` (b) `pd.read_csv('filename.csv')`
(c) `pd.load_csv('filename.csv')` (d) `pd.import_csv('filename.csv')`

Ans. (b) `pd.read_csv('filename.csv')`

10. What is plagiarism? [1]

(a) Using copyrighted material without giving proper acknowledgement to the source
(b) Downloading illegal software
(c) Spreading misinformation online
(d) Hacking into computer systems

Ans. (a) Using copyrighted material without giving proper acknowledgement to the source

11. Fill in the Blank [1]
The `COUNT(*)` function provides the total number of _____ within a relation (table) in a relational database.

(a) Columns (b) Unique values
(c) Not-null values (d) Rows

Ans. (d) Rows

12. In which of the network topologies do all devices connect to a central point, such as a switch or hub? [1]

(a) Star (b) Bus
(c) Tree (d) Mesh

Ans. (a) Star

13. In a Pandas DataFrame, if the `tail()` function is used without specifying the optional argument indicating the number of rows to display, what is the default number of rows displayed, considering the DataFrame has 10 entries? [1]

(a) 0 (b) 1
(c) 4 (d) 5

Ans. (d) 5

14. Identify the type of cybercrime that involves sending fraudulent emails to deceive individuals into revealing sensitive information. [1]

(a) Hacking (b) Phishing
(c) Cyberbullying (d) Cyberstalking

Ans. (b) Phishing

15. While creating a Series using a dictionary, the keys of the dictionary become: [1]

(a) Values of the Series (b) Indices of the Series
(c) Data type of the Series (d) Name of the Series

Ans. (b) Indices of the Series

16. Match the following SQL functions/clauses with their descriptions: [1]

SQL Function		Description	
P.	`MAX()`	1.	Find the position of a substring in a string.
Q.	`SUBSTRING()`	2.	Returns the maximum value in a column.
R.	`INSTR()`	3.	Sorts the data based on a column.
S.	`ORDER BY`	4.	Extracts a portion of a string.

(a) P-2, Q-4, R-3, S-1 (b) P-2, Q-4, R-1, S-3
(c) P-4, Q-3, R-2, S-1 (d) P-4, Q-2, R-1, S-3

Ans. (b) P-2, Q-4, R-1, S-3

17. Fill in the Blank [1]

Boolean indexing in Pandas DataFrame can be used for _____.

(a) Creating a new DataFrame (b) Sorting data based on index labels

(c) Joining data using labels (d) Filtering data based on condition

Ans. (d) Filtering data based on condition

18. Which Matplotlib plot is best suited to represent changes in data over time? [1]

(a) Bar plot (b) Histogram

(c) Line plot (d) Histogram & Bar plot

Ans. (c) Line plot

19. Which type of network covers a small geographical area like a single office, building, or school campus? [1]

(a) PAN (b) MAN

(c) LAN (d) WAN

Ans. (c) LAN

Questions 20 and 21 are Assertion (A) and Reason (R) Type questions. Choose the correct option 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.

20. Assertion (A): We can add a new column in an existing DataFrame. [1]

Reasoning (R): DataFrames are size mutable.

Ans. (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

21. Assertion (A): In SQL, `INSERT INTO` is a Data Definition Language (DDL) Command. [1]

Reasoning (R): DDL commands are used to create, modify, or remove database structures, such as tables.

Ans. (d) Assertion (A) is False, but Reason (R) is True.

Section B

22. (a) What is a Series in Python Pandas? Also, give a suitable example to support your answer. [2]

OR

(b) What does the term 'library' signify in Python? Mention one use for each of the following libraries:

- Pandas
- Matplotlib

Ans. (a) A Series is a one-dimensional array containing a sequence of values of any data type (int, float, list, string, etc.) which by default have numeric data labels starting from zero.

We can imagine a Pandas Series as a column in a spreadsheet. An example of a series containing the names of students is given below:

Index	Value
0	Arnab
1	Samridhi
2	Ramit
3	Divyam

OR

(b) Library: A collection of modules providing functionalities for specific tasks.

Pandas: Used for data analysis

Matplotlib: Used for creating plots

23. What are intellectual property rights (IPR), and why are they important in the digital world? [2]

Ans. **Intellectual Property Rights (IPR)**

These are legal rights that protect the creations of the human intellect. The nature of these works can be artistic, literary or technical etc.

Importance in the digital world

These rights help prevent the unauthorized use or reproduction of digital content and ensure that creators are fairly compensated and incentivized for their original work.

24. Consider the string: "Database Management System". Write suitable SQL queries for the following: [2]

(a) To extract and display "Manage" from the string.

(b) Display the position of the first occurrence of "base" in the given string.

Ans. (a)
```
SELECT SUBSTRING('Database Management System', 10, 6);
```
(b)
```
SELECT INSTR('Database Management System', 'base');
```

25. (a) What is Internet and how does it differ from World Wide Web (WWW)? [2]

OR

(b) Explain the concept of browser cookies and mention one advantage of using them.

Ans. (a) The Internet is a vast network of interconnected computer networks facilitating global communication and data exchange. The World Wide Web (WWW), on the other hand, is a system of interlinked hypertext documents accessed via the Internet.

OR

(b) **Browser cookies:** Small pieces of data stored on our digital devices by websites to remember information and personalize our experience.

Advantage: Improve user experience by remembering preferences, like our preferred language and other settings.

26. Define the term Primary Key in a database. Explain how it is different from a Candidate Key. [2]

Ans. **Primary Key :** A set of attributes that can uniquely identify each row in a table (relation). It must contain unique values and cannot be null.

How it differs from Candidate Key

There can be multiple Candidate Keys in a table (relation), but only one of them is selected as Primary Key.

27. Mention two health concerns associated with excessive use of Digital Devices. [2]

Ans. Two health concerns due to excessive use of Digital Devices:

(a) Eye strain and vision problems

(b) Musculoskeletal issues like neck and back pain

28. (a) Sneha is writing a Python program to create a DataFrame using a list of dictionaries. However, her code contains some mistakes. Identify the errors, rewrite the correct code, and underline the corrections made. [2]

```
import Pandas as pd
D1 = {'Name': 'Rakshit', 'Age': 25}
D2 = {'Name': 'Paul', 'Age': 30}
D3 = {'Name': 'Ayesha', 'Age': 28}
data = [D1,D2,D3)
df = pd.Dataframe(data)
print(df)
```

OR

(b) Complete the given Python code to get the required output (ignore the dtype attribute) as

Output:

Tamil Nadu	Chennai
Uttar Pradesh	Lucknow
Manipur	Imphal

Code:

```
import _______ as pd
data = ['Chennai','_______','Imphal']
indx = ['Tamil Nadu','Uttar Pradesh','Manipur']
s = pd.Series(_______, indx)
print(_______)
```

Ans. (a)

```
import pandas as pd
D1 = {'Name': 'Rakshit', 'Age': 25}
D2 = {'Name': 'Paul', 'Age': 30}
D3 = {'Name': 'Ayesha', 'Age': 28}
data = [D1, D2, D3]
df = pd.DataFrame(data)
print(df)
```

Changes Made :

(i) Changed Pandas to pandas.

(ii) Corrected mismatched string quotation marks

(iii) Corrected the closing parenthesis in the list data.

(iv) Changed Dataframe to DataFrame.

OR

(b)

```
import pandas as pd
data = ['Chennai', 'Lucknow', 'Imphal']
indx = ['Tamil Nadu','Uttar Pradesh','Manipur']
s = pd.Series(data, indx)
print(s)
```

Section C

29. Ayesha's family is replacing their old computer with a new one. They decide to throw the old computer in a nearby empty field/plot. [3]

(a) Explain any one potential environmental hazard associated with improper e-waste disposal.

(b) Suggest one responsible way to Ayesha's family for proper disposal of their old computer.

(c) Describe the importance of recycling in e-waste management.

Ans. (a) E-waste can release harmful substances like lead and mercury into the environment.

(b) They can donate or sell it to a certified e-waste recycling center.

(c) Recycling e-waste helps conserve natural resources and reduces pollution.

30. (a) Write a Python program to create the following DataFrame using a list of dictionaries. [3]

	Product	Price
0	Laptop	60000
1	Desktop	45000
2	Monitor	15000
3	Tablet	30000

OR

(b) Write a Python Program to create a Pandas Series as shown below using a dictionary. Note that the left column indicates the indices and the right column displays the data.

Russia	Moscow
Hungary	Budapest
Switzerland	Bern

Ans. (a)
```
import pandas as pd
d1 = {'Product': 'Laptop', 'Price': 60000}
d2 = {'Product': 'Desktop', 'Price': 45000}
d3 = {'Product': 'Monitor', 'Price': 15000}
d4 = {'Product': 'Tablet', 'Price': 30000}
data = [d1, d2, d3, d4]
df = pd.DataFrame(data)
print(df)
```

OR

(b)
```
import pandas as pd
data = {'Russia':'Moscow','Hungary':'Budapest','Switzerland':'Bern'}
s = pd.Series(data)
print(s)
```

31. (a) Write an SQL statement to create a table named STUDENTS, with the following specifications: [3]

Column Name	Data Type	Key
StudentID	Numeric	Primary Key
FirstName	Varchar(20)	
LastName	Varchar(10)	
DateOfBirth	Date	
Percentage	Float(10,2)	

(b) Write SQL Query to insert the following data in the Table STUDENTS:
1, Supriya, Singh, 2010-08-18, 75.5

Ans. (a)

CREATE TABLE STUDENTS

StudentID	Numeric	Primary Key
FirstName	Varchar(20)	
LastName	Varchar(10)	
DateOfBirth	Date	
Percentage	Float(10,2)	

(b)
```
INSERT INTO STUDENTS (StudentID, FirstName, LastName, DateOfBirth,
Percentage) VALUES (1, 'Supriya', 'Singh', '2010-08-18', 75.5);
```

32. (a) Consider the following tables: [3]

Table 1:

EMPLOYEE which stores Employee ID (EMP_ID), Employee Name (EMP_NAME), Employee City (EMP_CITY)

Table 2:

PAYROLL which stores Employee ID (EMP_ID), Department (DEPARTMENT), Designation (DESIGNATION), and Salary (SALARY) for various employees.

Note: Attribute names are written within brackets.

Table: EMPLOYEE

EMP_ID	EMP_NAME	EMP_CITY
1	ABHINAV	AGRA
2	KABIR	FARIDABAD
3	ESHA	NOIDA
4	PAUL	SEOUL
5	VICTORIA	LONDON

Table: PAYROLL

EMP_ID	DEPARTMENT	DESIGNATION	SALARY
1	SALES	MANAGER	75000
2	SALES	ASSOCIATE	50000
3	ENGINEERING	MANAGER	95000
4	ENGINEERING	ENGINEER	70000
5	MARKETING	MANAGER	65000

Write appropriate SQL queries for the following:

(i) Display department-wise average Salary.

(ii) List all designations in the decreasing order of Salary.

(iii) Display employee name along with their corresponding departments.

OR

(b) Consider the following tables:

Table 1:

`ATHLETE`, which stores `AthleteID`, `Name`, `Country`. The table displays basic information of the athletes.

Table 2:

`MEDALS`, which stores `AthleteID`, `Sport`, and `Medals`. The table displays the number of medals won by each athlete in their respective sports.

Table: ATHLETE

AthleteID	Name	COUNTRY
101	Arjun	INDIA
102	Priya	INDIA
103	Asif	UAE
104	Rozy	USA
105	David	DENMARK

Table: MEDALS

AthleteID	Sport	Medals
101	Swimming	8
102	Track	3
103	Gymnastics	5
104	Swimming	2
105	Track	6

Write appropriate SQL queries for the following:

(i) Display the sports-wise total number of medals won.

(ii) Display the names of all the Indian athletes in uppercase.

(iii) Display the athlete name along with their corresponding sports.

Ans. (a) (i)
```
SELECT DEPARTMENT, AVG(SALARY) FROM PAYROLL GROUP BY DEPARTMENT;
```
(ii)
```
SELECT DESIGNATION FROM PAYROLL ORDER BY SALARY DESC;
```
(iii)
```
SELECT EMP_NAME, DEPARTMENT FROM EMPLOYEE E, PAYROLL P WHERE E.EMP_ID=P.
EMP_ID;
```

OR

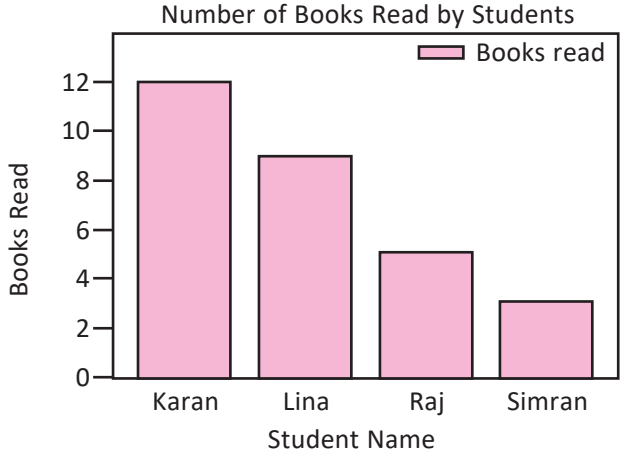
(b) (i)
```
SELECT SPORT,SUM(Medals) FROM MEDALS GROUP BY SPORT;
```
(ii)
```
SELECT UPPER(Name) FROM ATHLETE WHERE COUNTRY = 'INDIA';
```
(iii)
```
SELECT NAME, SPORT FROM ATHLETE A, MEDALS M WHERE
A.AthleteID= M.AthleteID;
```

Section D

33. During a practical exam, a student Ankita has to fill in the blanks in a Python program that generates a bar chart. This bar chart represents the number of books read by four students in one month. [4]

Student Name	Books Read
Karan	12
Lina	9
Raj	5
Simran	3

Help Ankita to complete the code.




```
import _____ as plt #Statement-1
students = ['Karan', 'Lina', 'Raj', 'Simran']
books_read = [12, 9, 5, 3]
plt.bar( students, _____, label='Books Read') #Statement-2
plt.xlabel('Student Name')
plt._____('Books Read') #Statement-3
plt.legend()
plt.title('_____') #Statement-4
plt.show()
```

(a) Write the suitable code for the import statement in the blank space in the line marked as Statement-1.
(b) Refer to the graph shown above and fill in the blank in Statement-2 with suitable Python code.
(c) Fill in the blank in Statement-3 with the name of the function to set the label on the y-axis.
(d) Refer the graph shown above and fill the blank in Statement-4 with suitable Chart Title.

Ans. (a) `matplotlib.pyplot`
(b) `books_read`
(c) `ylabel`
(d) `Number of Books Read by Students`

34. (a) Rahul, who works as a database designer, has developed a database for a bookshop. This database includes a table `BOOK` whose column (attribute) names are mentioned below: [4]

`BCODE`: Shows the unique code for each book.
`TITLE`: Indicates the book's title.
`AUTHOR`: Specifies the author's name.
`PRICE`: Lists the cost of the book.

Table: BOOK

BCODE	TITLE	AUTHOR	PRICE
B001	MIDNIGHT'S CHILDREN	SALMAN RUSHDIE	500
B002	THE GOD OF SMALL THINGS	ARUNDHATI ROY	450
B003	A SUITABLE BOY	VIKRAM SETH	600
B004	THE WHITE TIGER	ARAVIND ADIGA	399
B005	TRAIN TO PAKISTAN	KHUSHWANT SINGH	350

(i) Write SQL query to display book titles in lowercase.

(ii) Write SQL query to display the highest price among the books.

(iii) Write SQL query to display the number of characters in each book title.

(iv) Write SQL query to display the Book Code and Price sorted by Price in descending order.

OR

(b) Dr. Kavita has created a database for a hospital's pharmacy. The database includes a table named MEDICINE whose column (attribute) names are mentioned below:

MID: Shows the unique code for each medicine.

MED_NAME: Specifies the medicine name

SUPP_CITY: Specifies the city where the supplier is located.

STOCK: Indicates the quantity of medicine available.

DEL_DATE: Specifies the date when the medicine was delivered.

Table: MEDICINE

MID	MED_NAME	SUPP_CITY	STOCK	DEL_DATE
M01	PARACETAMOL	MUMBAI	200	2023-06-15
M02	AMOXICILLIN	KOLKATA	50	2023-03-21
M03	COUGH SYRUP	BENGALURU	120	2023-02-10
M04	INSULIN	CHENNAI	135	2023-01-25
M05	IBUPROFEN	AHMEDABAD	30	2023-04-05

Write output of the following SQL Queries:

(i) `Select LENGTH(MED_NAME) from MEDICINE where STOCK > 100;`

(ii) `Select MED_NAME from MEDICINE where month(DEL_DATE) = 4;`

(iii) `Select MED_NAME from MEDICINE where STOCK between 120 and 200;`

(iv) `Select max(DEL_DATE) from MEDICINE;`

Ans. (a) (i) `SELECT LOWER(TITLE) FROM BOOK;`

(ii) `SELECT MAX(PRICE) FROM BOOK;`

(iii) `SELECT LENGTH(TITLE) FROM BOOK;`

(iv) `SELECT BCODE, PRICE FROM BOOK ORDER BY PRICE DESC;`

OR

(b) (i)

LENGTH(MED_NAME)
11
11
7

(ii)

MED_NAME
IBUPROFEN

(iii)

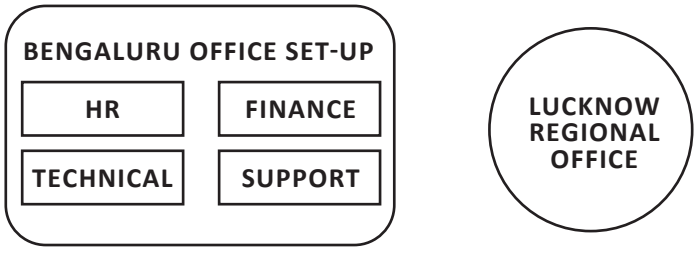
MED_NAME
PARACETAMOL
COUGH SYRUP
INSULIN

(iv)

max(DEL_DATE)
2023-06-15

Section E

35. ABC Pvt. Ltd., a multinational technology company, is looking to establish its Indian Head Office in Bengaluru, and a regional office branch in Lucknow. The Bengaluru head office will be organized into four departments: HR, FINANCE, TECHNICAL, and SUPPORT. As a network engineer, you have to propose solutions for various queries listed from (a) to (e). [5]



The shortest distances between the departments/offices are as follows:

HR TO FINANCE	65 M
HR TO TECHNICAL	80 M
HR TO SUPPORT	70 M
FINANCE TO TECHNICAL	60 M
FINANCE TO SUPPORT	75 M
TECHNICAL TO SUPPORT	50 M
BENGALURU OFFICE TO LUCKNOW	1900 KM

The number of computers in each department/office is as follows:

HR	175
FINANCE	35
TECHNICAL	50
SUPPORT	15
LUCKNOW OFFICE	40

(a) Suggest the most suitable department in the Bengaluru Office Setup, to install the server. Also, give a reason to justify your suggested location.

(b) Draw a suitable cable layout of wired network connectivity between the departments in the Bengaluru Office.

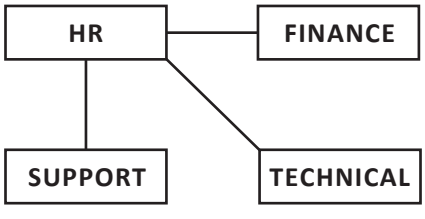
(c) Which networking device would you suggest the company to purchase to interconnect all the computers within a department in Bengaluru Office?

(d) The company is considering establishing a network connection between its Bengaluru Head Office and Lucknow regional office. Which type of network—LAN, MAN, or WAN—will be created? Justify your answer.

(e) The company plans to develop an interactive website that will enable its employees to monitor their performance after login. Would you recommend a static or dynamic website, and why?

Ans. (a) The server should be installed in the HR department as it has the most number of computers.

(b) Star topology



(c) Switch/Hub

(d) WAN (Wide Area Network) will be created as the offices are located in different cities.

(e) A dynamic website is recommended as it can display the dynamic performance data (which differs from employee to employee) of each employee.

36. Consider the DataFrame *df* shown below. [5]

	MovieID	Title	Year	Rating
0	1	LAGAAN	2001	8.4
1	2	TAARE ZAMEEN PAR	2007	8.5
2	3	3 IDIOTS	2009	8.4
3	4	DANGAL	2016	8.4
4	5	ANDHADHUN	2018	8.3

Write Python statements for the DataFrame `df` to:

(a) Print the first two rows of the DataFrame `df`.

(b) Display titles of all the movies.

(c) Remove the column rating.

(d) Display the data of the `'Title'` column from indexes 2 to 4 (both included)

(e) Rename the column name `'Title' to 'Name'`.

Ans. (a) `print(df.head(2))`

(b) `print(df['Title'])`

(c) `df = df.drop('Rating', axis=1)`

(d) `print(df.loc[2:4,'Title'])`

(e) `df.rename(columns={'Title':'Name'}, inplace=True)`

37. (a) Write suitable SQL query for the following: [5]

(i) To display the average score from the `test_results` column (attribute) in the `Exams` table.

(ii) To display the last three characters of the `registration_number` column (attribute) in the `Vehicles` table. (Note: The registration numbers are stored in the format DL-01-AV-1234).

(iii) To display the data from the column (attribute) `username` in the `Users` table, after eliminating any leading and trailing spaces.

(iv) To display the maximum value in the `salary` column (attribute) of the `Employees` table.

(v) To determine the count of rows in the `Suppliers` table.

OR

(b) Write suitable SQL query for the following:

(i) Round the value of pi (3.14159) to two decimal places.

(ii) Calculate the remainder when 125 is divided by 8.

(iii) Display the number of characters in the word 'NewDelhi'.

(iv) Display the first 5 characters from the word 'Informatics Practices'.

(v) Display details from `'email'` column (attribute), in the `'Students'` table, after removing any leading and trailing spaces.

Ans. (a) (i) `SELECT AVG(test_results) FROM Exams;`

(ii) `SELECT RIGHT(registration_number, 3) FROM Vehicles;`

(iii) `SELECT TRIM(username) FROM Users;`

(iv) `SELECT MAX(salary) FROM Employees;`

(v) `SELECT COUNT(*) FROM Suppliers;`

OR

(b) (i) `SELECT ROUND(3.14159, 2);`

(ii) `SELECT MOD(125, 8);`

(iii) `SELECT LENGTH('NewDelhi');`

(iv) `SELECT LEFT('Informatics Practices', 5);`

(v) `SELECT TRIM(email) FROM Students;`