

SOLVED

Sample Question Paper-6

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions:

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

SECTION-A

Question 1 to 16 are multiple choice questions. Only one of the choices is correct.
Select and write the correct choice as well as the answer to these questions.

1. State Whether the given Statement is True or False.

Statement: A DataFrame can be created from a dictionary of lists using the `pd.DataFrame()` constructor. [E] [1]

2. What is the result of the following SQL query?

SELECT LCASE('CLASS 12 IP');

[E] [1]

- (a) CLASS 12 IP (b) class 12 ip (c) Class 12 Ip (d) error

3. Which of the following activities is considered **legal and ethical** use of the Internet?

 [E] [1]

- (a) Sharing pirated movies
(b) Accessing someone's email without permission
(c) Reporting cyberbullying on a school portal
(d) Downloading paid apps from third-party sites for free

4. Which function is used to **read data from an CSV file** into a Pandas DataFrame?

 [E] [1]

- (a) `read_csv ()` (b) `import_excel ()` (c) `load_excel ()` (d) `open_excel`

5. Which networking device is used for **converting digital data to analog** and vice versa, allowing Internet access over telephone lines? [M] [1]

- (a) Router (b) Modem (c) Gateway (d) Switch

6. What will `ROUND(13.75, 1)` return in SQL?

 [M] [1]

- (a) 13.7 (b) 13.8 (c) 13 (d) 14

7. A company has created an original advertisement jingle for its new beverage. Which type of Intellectual Property Rights (IPR) best protects this jingle? [M] [1]

- (a) Patent (b) Trademark (c) Copyright (d) Trade Secret





8. Which method of a Series returns the **first few elements**?

 [E] [1]

- (a) `top()` (b) `begin()` (c) `head()` (d) `first()`

9. How many primary keys can a single table have?


[M] [1]

- (a) One or more (b) Only one (c) Unlimited (d) None
- 10.** A student accesses her school computer from home over the Internet using a secure login. This is an example of: [E] [1]
(a) Remote Access (b) Cloud Backup (c) Email (d) Web Browsing
- 11.** What will SELECT COUNT(marks) FROM students; return if some students have NULL in marks?  [H] [1]
(a) Total number of students (b) Only students with non-NULL marks
(c) All rows including NULLs (d) Error
- 12.** In Pandas, what does the add() method do when working with two Series? [H] [1]
(a) Adds elements without considering indices (b) Adds only the common indices
(c) Aligns by index and fills unmatched values as NaN (d) Adds values with default index
- 13.** Which law in India provides legal recognition to electronic records and digital signatures? [E] [1]
(a) Digital Protection Act (b) Electronic Transaction Law
(c) Information Technology Act, 2000 (d) Cyber Law Enforcement Act
- 14.** If we want to sort a table by multiple columns, how should we use the ORDER BY clause? [H] [1]
(a) ORDER BY col1 OR col2 (b) ORDER BY col1, col2
(c) ORDER BY (col1 + col2) (d) GROUP BY col1, col2
- 15.** What is the result of df.loc[3:6] assuming integer index labels from 0 to 9?  [M] [1]
(a) Rows with indices 3 to 5 (b) Rows with indices 3 to 6
(c) Rows with indices 4 to 6 (d) Error
- 16.** Which topology is highly fault-tolerant due to multiple paths between nodes? [H] [1]
(a) Star (b) Mesh (c) Bus (d) Bus
- 17.** Which function will return the first three characters of the string 'PYTHON'?  [E] [1]
(a) LEFT('PYTHON', 3) (b) RIGHT('PYTHON', 3)
(c) SUBSTRING('PYTHON', 4, 3) (d) FIRST('PYTHON', 3)
- 18.** What does df.empty return when the DataFrame has no elements? [M] [1]
(a) 'Yes' (b) 0 (c) True (d) False
- 19.** Which SQL clause is commonly used with aggregate functions to group rows with the same values?  [E] [1]
(a) ORDER BY (b) GROUP BY (c) HAVING (d) WHERE
- 20. Assertion (A):** The drop() method can be used to remove rows or columns from a DataFrame.
Reason (R): To remove a row, the axis parameter in drop() must be set to 0. [M] [1]
(a) Both A and R are True, and R correctly explains A.
(b) Both A and R are True, but R does not correctly explain A.
(c) A is True, but R is False.
(d) A is False, but R is True.
- 21. Assertion (A):** The DELETE FROM table_name; command removes the entire table from the database.
Reason (R): DELETE is used to delete specific records from a table, not the table itself. [M] [1]
(a) Both A and R are True, and R correctly explains A.
(b) Both A and R are True, but R does not correctly explain A.
(c) A is True, but R is False.
(d) A is False, but R is True.

SECTION-B

- 22.** (a) Explain how indexing works in a Pandas Series. Demonstrate your explanation with an example showing custom index values. [M] [2]

OR

(b) How does Matplotlib help in data visualisation? Name one type of chart it can produce and describe a situation where it would be useful.
- 23.** What is the role of copyright in protecting digital content? Explain how it benefits both creators and users in the online environment. [M] [2]
- 24.** Given the string: 'Digital Communication Era' Write SQL queries to:
(i) Display the position of 'Comm' in the string.
(ii) Convert the entire string to lowercase.  [E] [2]

25. (a) Define a URL. What are its main components? Give an example to illustrate each part.

 [M] [2]

OR

- (b) What are third-party cookies? Why are they often blocked or restricted by modern web browsers?

26. What is the significance of using a Primary Key in a relational database table? How does it ensure data integrity?

 [E] [2]

27. Discuss the physical health problems that may arise due to poor posture while using computers or smartphones.

[M] [2]

28. (a) Sana attempts to create a DataFrame from a list of lists, but her program throws an error. Identify and correct the mistakes, highlighting them.

```
import panda as pd
records = [['Tom', 21], ['Jerry', 22], ['Spike', 20]]
df = pd.dataFrame(records, column = ['Name', 'Age'])
print(df)
```

[M] [2]

OR

- (b) Complete the code to display the first two rows of the DataFrame.

Output:

```
      Name  Age
0  Riya   19
1  Aman   21

import pandas as pd
data = {'Name': ['Riya', 'Aman', 'Sana'], 'Age': [19, 21, 22]}
df = pd.DataFrame(_____)
print(df._____(2))
```

SECTION-C

29. Neha bought a new smartphone and decided to throw her old phone in the household garbage bin. Her younger brother stopped her and explained why it's not a good idea.

- (i) Why should electronic items not be disposed of with regular household waste?
(ii) Mention one harmful chemical commonly found in mobile phones.
(iii) Suggest one digital platform or service where Neha can recycle or donate her old phone.

 [M] [3]

30. (a) Write a Python program to create the following DataFrame using a series:

Subject	Marks
English	90
Physics	75
Chemistry	80
Maths	95

 [M] [3]

OR


- (b) Write a Python Program to create a Pandas Series.. The index represents company names and the data represents their founders.

Microsoft	Bill Gates
Tesla	Elon Musk
Facebook	Mark Zuckerberg

31. (i) Create an SQL table named BOOKS with the structure below:

Column Name	Data Type	Key
ISBN	Varchar(13)	Primary Key
Title	Varchar(50)	
Author	Varchar(30)	
PublishedOn	Date	
Price	Float(8,2)	

- (ii) Write an SQL query to insert this book record: '9780132350884', 'Clean Code', 'Robert C. Martin', '2008-08-01', 499.99

 [E] [3]

32. (a) Consider the given tables:

Table: PRODUCT

PROD_ID	NAME	SUP_ID	PRICE
P101	MOUSE	S1	350
P102	KEYBOARD	S2	550
P103	MONITOR	S1	7500

Table: SUPPLIER

SUP_ID	SUPPLIER_NAME	CITY
S1	TECH WORLD	CHENNAI
S2	GADGET HUB	MUMBAI
P103	MONITOR	S1

Write SQL Queries for the following:

- Display product names along with supplier names.
- List all products priced above ₹500.
- Show the total price of products supplied by each supplier.

[M] [3]

OR

(b) Consider the given tables:

Table: STUDENTS

StudentID	Name	Grade
S001	Nisha	10
S002	Aryan	12
S003	Junaid	11
S004	Riya	10
S005	Karan	12

Table: ATTENDANCE

StudentID	Date	Status
S001	2025-07-20	Present
S002	2025-07-20	Absent
S003	2025-07-20	Present
S004	2025-07-20	Present
S005	2025-07-20	Absent

Write SQL queries for the following:

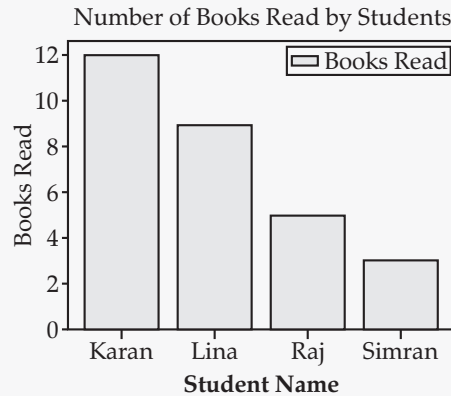
- Count how many students were present on 2025-07-20.
- Display the names of students who were absent.
- Show each student's name along with their attendance status.

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.

Student name	Book Read	Status
Karan	12	Present
Lina	9	Absent
Raj	5	Present
Simran	3	Present
S005	2025-07-20	Absent

Help Ankita to complete the code



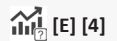
```
import _____ as plt                                #Statement-1
students = ['Karan', 'Lina', 'Raj', 'Simran']
books_read = [12, 9, 5, 3]
plt.bar(students, _____, label='Books Read')        #Statement-2
plt.xlabel('Student Name')
plt._____('Books Read')                                #Statement-3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

(i) Write the suitable code for the import statement in the blank space in the line marked as Statement-1.

(ii) Refer to the graph shown above and fill in the blank in Statement-2 with suitable Python code.

(iii) Fill in the blank in Statement-3 with the name of the function to set the label on the y-axis.

(iv) Refer to the graph shown above and fill in the blank in Statement-4 with suitable chart title.



34. (a) Preeti manages a database in a blockchain startup. 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 the oldest transaction.

(ii) Write a query to display the month of the most recent transaction.

(iii) Write a query to display all the transactions done in the month of May.

(iv) Write a query to count the total number of transactions in the year 2022.

[H] [4]

OR

- (b) A cosmetic company has maintained a database for its company. The database includes a table name called Fashion which stores the details of the cosmetic products along with their price and quantity. The column (Attribute) of the Fashion table is mentioned below:

ID: Refers to the cosmetic product Id.

Product: Refers to cosmetic product name.

Price: Refers to the price of the product.

Qty: Indicates the number of products needed.

Table: Fashion

ID	Product	Price	Qty
F01	Kajal	970	10
F02	Foundation	2,100	15
F03	Night Cream	1,700	20

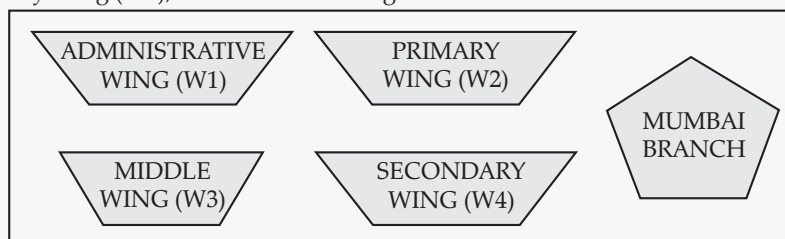
F04	Day Cream	1,400	10
F05	Shampoo	1,200	25
F06	Lipstick	850	32

Write the output of the following SQL Queries.

- SELECT COUNT (Product) FROM FASHION;
- SELECT SUM (Price*Qty) FROM FASHION WHERE Product = "Night Cream";
- SELECT LEFT (Product, 4) FROM FASHION WHERE Price > 1500;
- SELECT MAX (Price) FROM FASHION;

SECTION-E

35. 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.



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 is 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:

- Suggest the topology and draw the most suitable cable layout for connecting all the wings of the Delhi branch.
- Suggest the kind of network required (out of LAN, MAN, WAN) for connecting.
 - Administrative Wing (W1) With Middle Wing (W3)
 - Administrative Wing (W1) With the Mumbai Branch.
- Suggest the placement of the following devices with justification:
 - Repeater
 - Switch/ Hub
- Due to the pandemic, schools have 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.
- The company wants Internet accessibility in all the wings. Suggest a suitable technology.

 [M] [5]


36. Consider the DataFrame students shown below.

DataFrame: df_books


RollNo	Name	Class	Marks
101	Ankit	12	89
102	Riya	11	92
103	Aman	12	85
104	Sneha	11	95
105	Kunal	12	88

Write Python statements for the DataFrame students to:

- (i) Display only the names of all students
- (ii) Display the top 3 rows of the DataFrame
- (iii) Add a new row for student: 106, Neha, 11, 91
- (iv) Display data where class is 12
- (v) Drop the column Marks

 [H] [5]

- 37.** (a) (i) To extract the year part from the JoinDate column in the Employees table.
 (ii) To display the total quantity of all items from the Quantity column in the Inventory table.
 (iii) To convert the email values in the Users table to lowercase format.
 (iv) To find the number of products where Category is 'Electronics' in the Products table.
 (v) To calculate the average order value from the OrderAmount column in the Orders table where Status is 'Completed'.

 [M] [5]

OR

- (b) (i) Round the number 45.67891 to 1 decimal place.
 (ii) Find the square root of 144 using a SQL function.
 (iii) Display the position of the substring 'tech' in the string 'edutechplatform'.
 (iv) Extract the last 4 characters from the string 'SmartLearning'.
 (v) Show the data from the contact_number column in the Customers table after removing any leading or trailing spaces within the number (e.g., ' 1234567890 ' → '1234567890').

□□□