SOLVED

Sample Question Paper-5

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 following statement is True or False:

Statement: The rename() function can be used to change the column names in a DataFrame. **[E] [1]**

2. What will be the result of the following SQL query?

SELECT TRUNCATE(8.7654, 2); **[H] [1]**

(a) 8.77 **(b)** 8.76 **(c)** 8.75 **(d)** 8.7

3. Which of the following is the most appropriate step to avoid being a victim of phishing? **[M] [1]**

(a) Avoid using antivirus **(b)** Do not open unknown email attachments.
(c) Do not use social media **(d)** Do not follow any blog

4. Which of the following methods is used to get the number of rows and columns in a DataFrame. **[M] [1]**

(a) `df.shape()` **(b)** `df.len()` **(c)** `df.shape` **(d)** `df.size()`

5. Which device connects a Local Area Network (LAN) to the Internet? **[E] [1]**

(a) Repeater **(b)** Modem **(c)** Bridge **(d)** Router

6. Which of the following SQL expressions gives the remainder when 10 is divided by 3? **[E] [1]**

(a) 10 / 3 **(b)** MOD(10, 3) **(c)** ROUND(10, 3) **(d)** CEIL(10, 3)

7. Which type of Intellectual Property protects brand's unique identity, such as its logo, symbol, or brand name? **[M] [1]**

(a) Copyright **(b)** Patent **(c)** Prototype **(d)** Trademark

8. If you create a Series using `pd.Series([10, 20, 30])`, what will be the default index? **[M] [1]**

(a) 1, 2, 3 **(b)** 0, 1, 2 **(c)** 'a', 'b', 'c' **(d)** Random numbers

9. Which of the following is not true about a primary key? **[E] [1]**

(a) It can have NULL values. **(b)** It must be unique.
(c) It can be a combination of multiple columns. **(d)** It is used to uniquely identify records.

10. Which of the following protocols is primarily used for **sending emails**? **[M] [1]**
(a) FTP **(b)** SMTP **(c)** VoIP **(d)** POP

11. What will the SQL query `SELECT MIN(marks) FROM students;` return? **[E] [1]**
(a) Minimum marks **(b)** Maximum marks **(c)** Average marks **(d)** Total marks

12. Which function is used to **check missing (NaN) values** in a Pandas Series? **[H] [1]**
(a) `isnull()` **(b)** `isempty()` **(c)** `isNaN()` **(d)** `nullcheck()`

13. The Information Technology Act, 2000 in India mainly deals with: **[E] [1]**
(a) Regulating agricultural practices **(b)** Cyber crimes and electronic commerce
(c) Protecting traditional knowledge **(d)** Copyright of literary works

14. Which SQL clause is used **after GROUP BY** to filter aggregated data? **[M] [1]**
(a) ORDER BY **(b)** HAVING **(c)** WHERE **(d)** LIMIT

15. If a `DataFrame df` has 10 rows, what does `df.iloc[-1]` return? **[M] [1]**
(a) First row **(b)** Last row **(c)** Error **(d)** Second last row

16. Which topology is most suitable for **small networks with minimal cable length** requirements? **[M] [1]**
(a) Bus **(b)** Star **(c)** Mesh **(d)** Hybrid

17. What does the `SUBSTR('DATABASE', 2, 4)` return? **[H] [1]**
(a) REMOVE() **(b)** STRIP() **(c)** TRIM() **(d)** CUT()

18. What does `df.columns` return in a `DataFrame df`? **[E] [1]**
(a) Number of rows **(b)** List of column labels **(c)** Column values **(d)** Index names

19. Which of the following aggregate functions can be used on a text column? **[E] [1]**
(a) SUM() **(b)** COUNT() **(c)** AVG() **(d)** MOD()

20. **Assertion (A):** The method `df.tail(3)` returns the first 3 rows of the `DataFrame df`.
Reason (R): `tail(n)` displays the last n rows from a DataFrame. **[E] [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):** In SQL, `NOT NULL` is used to allow null values in a column.
Reason (R): `NOT NULL` is a constraint used to ensure that a column must have a value. **[E] [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) Differentiate between Series and DataFrame in Pandas**. Support your answer with appropriate examples. **[E] [2]**

OR

(b) What do you mean by the term "open-source Python library"? Explain how the following libraries help in data analysis.
- NumPy
- Pandas

23. Explain the role of Creative Commons licences. How do they benefit digital content creators? **[H] [2]**

24. Use the string: "Machine Learning with SQL". Write SQL queries to:
(i) Extract the substring "Learning" from the above string.
(ii) Show the position of "SQL" in the string. **[M] [2]**

25. **(a)** Define a URL. How is it different from a domain name? **[M] [2]**

OR

(b) What is a website? How is it different from a webpage? Give suitable examples.

26. What is a Composite Key? In what situations is it useful? **[H] [2]**

27. What is e-waste? Suggest two proper ways to manage it. **[M] [2]**

28. **(a)** Ananya is trying to generate a bar graph using Matplotlib, but her code doesn't run as expected. Find and correct the mistakes.

```
import matplotlib.pyplot as plt
x = ['Jan', 'Feb', 'Mar']
y = [10, 15, 12]
plt.bargraph(x, y)
plt.label('Months')
plt.show[]
```

[M] [2]

OR

(b) Complete the code to print a Series showing cities and their temperatures.

Expected Output:

Delhi 40
Mumbai 35
Kolkata 38

```
import _______ as pd
temps = [40, _______, 38]
cities = ['Delhi', 'Mumbai', 'Kolkata']
s = pd._______(temps, index=_______)
print(s)
```

SECTION-C

29. Ravi decided to discard his old mobile phone by throwing it into the household trash bin.

Answer the following:

(i) What harmful consequence might this have on the environment?

(ii) Recommend a safe method to dispose of old electronic devices like mobile phones.

(iii) How can recycling electronic gadgets contribute to environmental protection? **[M] [3]**

30. **(a)** Create a Python program that constructs the following DataFrame using a list of dictionaries representing book records.

	Title	Author
0	Python 101	John
1	Data World	Aarti
2	AI Basics	Vikram
3	SQL Master	Neha

[M] [3]

OR

(b) Write a Python program to create a Pandas Series, where each index is a programming language and the corresponding value is its founder.

Python	Guido
Java	Gosling
C++	Bjarne

31. Write an SQL command to create a table called STUDENTS with the following structure: **[E] [3]**

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

Also, write an SQL query to insert the following record into the STUDENTS table:
(1, 'Supriya', 'Singh', '2010-08-18', 75.5)

34. **(a)** Consider the following tables: Library Management System

Table: BOOKS

BOOK_ID	TITLE	AUTHOR	PRICE
1	Python Programming	Dr. Sharma	450
2	Data Science Essentials	R. Verma	620
3	Web Development Guide	A. Khan	550
4	Machine Learning Basics	P. Iyer	700
5	Cyber Security Handbook	N. Mehta	500

Table: ISSUE

ISSUE_ID	BOOK_ID	STUDENT_NAME	ISSUE_DATE	RETURNED
201	1	Riya	2025-07-01	YES
202	3	Aman	2025-07-10	NO
203	2	Tia	2025-07-15	YES
204	4	Kabir	2025-07-18	NO
205	5	Naina	2025-07-20	YES

Write appropriate SQL queries for the following:

(i) Display the title and author of books priced above 500.

(ii) List student names and book titles for books that have not been returned yet.

(iii) Display all book titles along with their prices, sorted in descending order of price. [H] [3]

OR

(b) Consider the following tables:

Table: CUSTOMERS

CUSTOMER_ID	CUSTOMER_NAME	CITY
1	Rahul	Surat
2	Meena	Delhi
3	Aditya	Mumbai
4	Nisha	Bangalore
5	Arjun	Jaipur

Table: ORDERS

ORDER_ID	CUSTOMER_ID	PRODUCT	QUANTITY	ORDER_DATE
101	1	Laptop	1	2025-07-05
102	2	Headphones	2	2025-07-06
103	3	Smartphone	1	2025-07-07
104	1	Keyboard	1	2025-07-08
105	4	Laptop	1	2025-07-09

Write appropriate SQL queries for the following:

(i) Display all customer names who have placed more than one order.

(ii) Show all orders placed by customers from Mumbai or Delhi.

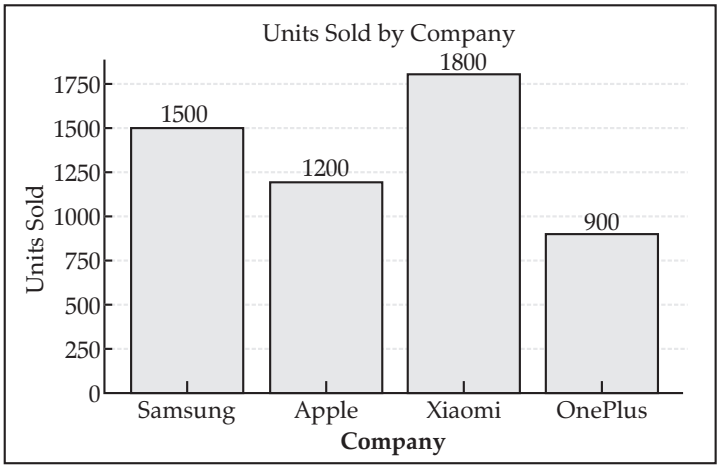
(iii) Count how many laptops were ordered.

SECTION-D

33. Shivani needs to complete a Python program that generates a bar chart showing mobile sales by 4 companies in the first quarter.

Company	Units Sold
Samsung	1500
Apple	1200
Xiaomi	1800
OnePlus	900

Help Shivani to complete the code.



Sub-Questions:

(i) Fill Statement-1 to import the required library.
(ii) Fill Statement-2 to plot sales.
(iii) Fill Statement-3 to label the Y-axis.
(iv) Fill Statement-4 with a proper chart title.

```
import _____ as plt  # Statement-1
brands = ['Samsung', 'Apple', 'Xiaomi', 'OnePlus']
sales = [1500, 1200, 1800, 900]
plt.bar(brands, _____, color='green')  # Statement-2
plt.xlabel('Company')
plt._____('Units Sold')  # Statement-3
plt.title('_____')  # Statement-4
plt.show()
```

[E] [4]

34. **(a)** Priya, a data analyst, maintains a table MOVIE for a streaming app. Table has following structure:
This database includes a table Bus whose column (attribute) names are mentioned below:
MCODE: Movie Code — A unique identifier for each movie (like a primary key). 4 M HEQ
TITLE: Movie Title — The name of the movie.
DIRECTOR: Director Name — Name of the person who directed the movie.
RATIN: Rating — Possibly a typo; should be RATING. It represents the average audience rating of the movie.

SchoolBus

MCODE	TITLE	DIRECTOR	RATING
M101	Inception	Christopher Nolan	8.8
M102	Dangal	Nitesh Tiwari	8.4
M103	Interstellar	Christopher Nolan	8.6
M104	The Lunchbox	Ritesh Batra	7.8
M105	Taare Zameen Par	Aamir Khan	8.5

(i) Write an SQL query to display all movie titles in uppercase.
(ii) Write an SQL query to display the maximum rating.

(iii) 3.Write an SQL query to count the number of characters in each movie title.

(iv) Write an SQL query to display MCODE and RATING sorted by RATING in ascending order. **[H] [4]**

OR

(b) Sameer created a table STUDENT for maintaining academic records with the following structure:

SID: Student ID – A **unique identifier** for each student.

NAME: Student Name – Full name of the student.

COURSE: Course Enrolled – The academic course or program the student is pursuing.

GRADE:- Final Grade – The overall academic performance of the student.

SID	NAME	COURSE	GRADE
S001	Anjali	BCA	A
S002	Raghav	BBA	B
S003	Neha	BCA	A+
S004	Sarthak	B.Com	B+
S005	Ayesha	BBA	A

(i) Write an SQL query to display all student names in lowercase.

(ii) Write an SQL query to find the total number of students in the BCA course.

(iii) Write an SQL query to display the number of characters in each student's name.

(iv) Write an SQL query to display the student ID and grade, sorted by grade in descending order.

SECTION-E

35. "Anutulya Creations"-A start-up fashion house has set up its main centre at Kanpur, Uttar Pradesh, for its dress designing, production and dress supplying activities. It has 4 blocks of buildings.

Distance between the various blocks is as follows:

A to D 50 m

A to P 60 m

A to S 110m

D to S 60m

P to S 50m

P to D 150m

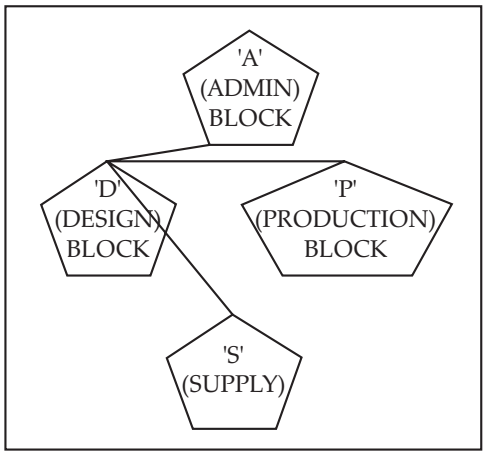
Numbers of computers in each block

Block A - 20

Block D - 80

Block P - 15

Block S – 8



Answer the following questions:

(i) Out of LAN, WAN and MAN, what type of network will be formed if we interconnect different computers of the campus? Justify.

(ii) Suggest the topology that should be used to efficiently connect various blocks of buildings within Kanpur centre for fast communication. Also, draw the cable layout for the same.

(iii) Suggest the placement of the following device with
Justification:
(a) Repeater
(b) Hub/Switch

(iv) Nowadays, video conferencing software is being used frequently by the company to discuss the product details with the clients. Name any one video conferencing software. Also mention the protocol which is used internally in video conferencing software.

(v) Suggest the placement of the Server. **[M] [5]**

36. Consider the DataFrame df1 shown below.

Roll	Name	Class	Marks
101	Anaya	12	88
102	Rohan	11	76
103	Meena	12	92
104	Aarav	11	81
105	Sanya	12	85

Answer the following questions based on above dataframe:

(i) Display the last three rows of the DataFrame df1.

(ii) Show all the names of students.

(iii) Drop the column Marks.

(iv) Print names from index 1 to 3 (inclusive).

(v) Rename the column Name to StudentName. **[H] [5]**

37. **(a)** Consider the following table named Products, which stores details of items available in a store:

product_id	product_name	price	stock_quantity
101	Pen	10	200
102	Notebook	50	120
103	Pencil	5	500
104	Bag	800	50
105	Mouse	500	80

Answer the following questions based on the above table:

(i) Write an SQL query to display the average value from the price column in the Products table.

(ii) Write an SQL query to extract the first four characters of the product_name column.

(iii) Write an SQL query to show the total number of products available in the Products table.

(iv) Write an SQL query to find the highest stock quantity in the Products table.

(v) Write an SQL query to convert the product_name to uppercase while displaying it. **[M] [5]**

OR

(b) Consider the t table Customers with the given columns: customer_id, full_name, email, city
Answer the following questions based on table Customers:

(i) Write an SQL query to display the number of characters in each value of the full_name column.

(ii) Write an SQL query to convert the email column values to lowercase.

(iii) Write an SQL query to count the number of distinct cities from the Customers table.

(iv) Write an SQL query to remove extra spaces from the full_name column.

(v) Write an SQL query to display customers in alphabetical order of their full_name.

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