SOLVED

Sample Question Paper-10

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:**

The **reset_index()** method restores the default integer index after you've set a new index. **[1]**

2. What will be the result of the following SQL query? SELECT MOD(3, 7); **[1]**

(a) 3 **(b)** 4 **(c)** 0 **(d)** 1

3. Rahul's social media account was accessed without permission and used to send inappropriate messages. What type of cybercrime occurred? **[1]**

(a) Cyber bullying **(b)** Hacking **(c)** Phishing **(d)** Cyber Stalking

4. How do you read only the first 100 rows of a CSV file into a DataFrame? **[1]**

(a) `pd.read_csv('file.csv', max_rows=100)` **(b)** `pd.read_csv('file.csv', nrows=100)`

(c) `pd.read_csv('file.csv', rows=100)` **(d)** `pd.read_csv('file.csv', head=100)`

5. Which hardware device connects multiple devices on the same network andfilters data traffic by MAC address? **[1]**

(a) Proxy **(b)** Switch **(c)** Firewall **(d)** Modem

6. In MySQL, what does ROUND(123.456) returns by default,when no precision is specified? **[1]**

(a) 0 decimal places **(b)** 1 decimal place

(c) Same number of decimals as the input **(d)** Error

7. Dev created a distinctive logo for his new café chain. Which type of intellectual property right will help him protect that logo? **[1]**

(a) Patent **(b)** Copyright

(c) Trademark **(d)** Both Copyright & Trademark

8. The attribute that returns the axis labels of a Series is _____. **[1]**

(a) labels **(b)** index **(c)** axes **(d)** axis

9. Which of the following is an example of a composite primary key? [1]
(a) SSN **(b)** PhoneNumber
(c) FullName (stored as FirstName + LastName) **(d)** EmployeeID

10. Which of the following enterprise solutions is built around VoIP technology? [1]
(a) Local File Server **(b)** On-premise Database
(c) Unified Communications (Voice & Video) **(d)** Barcode Scanning System

11. Which function computes the sum of all non-NULL numeric values in column_name? [1]
(a) AVG(column_name) **(b)** SUM(column_name)
(c) COUNT(column_name) **(d)** TOTAL(column_name)

12. Which of the following can be used as the index of a Pandas Series? [1]
(a) Only numbers **(b)** Only strings **(c)** Both numbers and labels **(d)** Only dates

13. The authority responsible for licensing and regulating Certifying Authorities under the IT Act is the Controller of _____.
(a) Digital Signatures **(b)** Certifying Authorities **(c)** Electronic Transactions **(d)** Cyber Regulations

14. Which clause filters individual rows before any grouping or aggregation takes place? [1]
(a) WHERE **(b)** HAVING **(c)** GROUP BY **(d)** ORDER BY

15. How do you select rows 1 to 4 (inclusive) and only the columns "A" and "C" from df? [1]
(a) df.loc[1:4, ['A','C']] **(b)** df.loc[:, ['A','C']][1:4] **(c)** df.iloc[1:5, [0,2]] **(d)** df.at[1,['A','C']]

16. In which topology are nodes connected in a closed loop, with each node having exactly two neighbours? [1]
(a) Ring **(b)** Mesh **(c)** Star **(d)** Bus

17. How does the SUBSTRING() (or MID()/SUBSTR()) function work? [1]
(a) It finds the position of a substring within a string.
(b) It returns a specified number of characters from within a string starting at a given position.
(c) It measures the total length of a string.
(d) It pads a string with spaces.

18. What will construct a DataFrame from a list of dictionaries? [1]
(a) pandas.DataFrame.from_dict([{'a':1},{'a':2}]) **(b)** pandas.DataFrame.from_records([{'a':1},{'a':2}])
(c) pandas.DataFrame({'a':[1,2]}) **(d)** pandas.Series([{'a':1},{'a':2}])

19. Which of the following is NOT an aggregate function? [1]
(a) ROUND() **(b)** COUNT() **(c)** MIN() **(d)** AVG()

20. **Assertion (A):** df.T transposes the DataFrame converting rows to columns and vice versa.
Reason (R): The T attribute rotates the DataFrame by 90 degrees clockwise. [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 INSERT command is classified as DML.
Reason (R): DML commands include operations that retrieve, insert, update or delete data in tables. [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)** What is an Index in Pandas? Mention any one characteristic of Index. [2]

OR

(b) Mention any two differences in how data types are managed in Series versus DataFrame.

23. What is e-waste? Mention any one impact of e-waste on air quality. [2]

24. Ravi wants to create a Pandas DataFrame as shown below:

	id	name
0	1	Alice
1	2	Bob

Help him complete the code below to achieve the desired output. import ___ as pd

```
data = {
'id': ___,
'name': ___
}
df = pd.___(data)
print(df)
```

[2]

25. **(a)** Rohan wonders how the URL he types in the browser actually connects to his hosted files. Explain the relation between URLs, IP addresses and web servers. **[2]**

OR

(b) What is web hosting? Give one example of a web hosting service.

26. Write SQL queries to perform the following:

(i) Display the name of the day (e.g., Monday, Tuesday) for the date '2025-01-05'.

(ii) Convert the string "incredible india" to uppercase. **[2]**

27. Define ethical hacking and explain how it differs from non-ethical hacking? **[2]**

28. **(a)** Write the output of the following code:

```
import pandas as pd
emp_id = pd.Series([101, 102, 103])
salaries = pd.Series([50000, 60000, 55000])
df = pd.DataFrame({'ID': emp_id, 'Salary': salaries})
df.rename(columns={'ID': 'EmpID', 'Salary': 'Pay'}, inplace=True)
print(df)
```

[2]

OR

(b) Write the output of the following code:

```
import pandas as pd
languages = pd.Series(['Python', 'Java', 'C++'])
creators = pd.Series(['Guido van Rossum', 'James Gosling', 'Bjarne Stroustrup'])
df = pd.DataFrame({'Language': languages, 'Creator': creators})
df = df[df.index != 1]print(df)
```

SECTION-C

29. Worried about the theft of his solar-powered water decontamination machine, Rakesh inquires:

(i) What are IP and IPR?

(ii) Which IPR tool covers his machine?

(iii) Why do inventors need strong IPR? **[3]**

30. **(a)** Write a Python program to create a Pandas Series as shown below using a ndarray, where the subject names are the indices and the corresponding marks are the values in the series:

English	92
Art	85
Music	89
Drama	90

[3]

OR

(b) Write a Python program to create a Pandas DataFrame displayed below using a dictionary of lists.

	Country	Capital
0	USA	Washington
1	Canada	Ottawa
2	Mexico	Mexico City

31. **(i)** I.Write an SQL statement to create a table named STUDENTS with the following specifications:

Column Name	Data Type	Key
StudentsID	Integer	Primary key
FullName	Varchar (40)	
DOB	Date	
Grade	Char (2)	

(ii) Write an SQL query to insert the following data into the STUDENTS table: 501, 'Anjali Das', '2006-08-21', 'A+' **[3]**

32. **(a)** Consider the following tables:

Table 1: STUDENT, which stores **StudentID, Name** and **Class.**

StudentID	Name	Class
ST10	Rahul	11
ST11	Meera	12
ST12	Ishaan	11
ST13	Tanya	12
ST14	Priya	11

Table 2: MARKS, which stores **StudentID, Subject** and **Score**

StudentID	Subject	Score
ST10	Physics	79
ST11	Chemistry	84
ST12	Biology	91
ST13	Mathematics	75
ST14	English	89

Write appropriate SQL queries for the following:

(i) Show classes with more than one student enrolled.

(ii) Show all subjects and scores where score is between 75 and 90.

(iii) Display student names, subjects, and scores sorted by score. **[3]**

OR

(b) Consider the following table EMPLOYEE, which stores EmployeeID, Name, Department and Salary.

Table: EMPLOYEE

EmployeeID	Name	Department	Salary
E301	Anjali	Finance	70000
E302	Ramesh	IT	65000
E303	Deepika	Marketing	60000
E304	Vikrant	Finance	72000
E305	Deepika	Marketing	60000

(i) Which attribute in the Table can be considered as the Primary Key? Provide justification for your answer.

(ii) Write a suitable SQL query to add a new column, Experience, of numeric data type to the table.

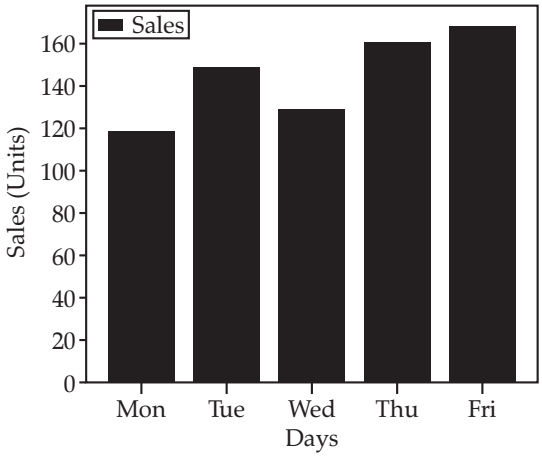
(iii) Write the output of the following SQL query.
SELECT Department, COUNT(*) FROM Employee GROUP BY Department;

SECTION-D

33. Kavita is plotting a bar chart of daily sales.

Day	Sales (Units)
Mon	120

Tue	150
Wed	130
Thu	160
Fri	170



Help Kavita to complete the code.

```
as plt #Statement-1
Days = ['Mon', 'Tue', 'Wed', 'Thu', 'Fri']
Sales = [120, 150, 130, 160, 170]
#Statement-2
plt.xlabel('Days')
plt.ylabel('Sales (Units)')
#Statement-3
plt.legend()
#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) Write the suitable code for the blank space in the line marked as Statement-2, which plots the bar graph with the appropriate data and includes a label for the legend.
(iii) Fill in the blank in Statement-3 with the correct Python code to set the title of the graph.
(iv) Fill in the blank in Statement-4 with the appropriate Python code to save the graph as an image file named daily_sales.png **[4]**

34. **(a)** Ritika, who works as a database designer, has created a table Book as shown below:

Table: Book

BookID	Title	Genre	Price	Publish_Date
201	Python Basics	Education	450	2021-06-15
202	The Silent Patient	Thriller	350	2020-09-10
203	Data Science 101	Education	600	2022-03-05
204	Midnight Library	Fiction	400	2021-11-25
205	Atomic Habits	Self-help	500	2020-01-20

Write suitable SQL queries for the following.
(i) Display the title and Genre in uppercase sorted by Price in descending order.
(ii) Show BookID and the year of the book's publication.
(iii) Calculated the total price of all books in the Education genre.
(iv) Show each genre and the number of books in it. **[4]**

OR

(b) Consider the following table and write the output of the following SQL queries.

Table: Employee

EmpID	Name	Department	Age	Join_Date
401	Arjun Verma	HR	29	2021-04-10
402	Meera Joshi	IT	32	2020-03-15

403	Rahul Singh	Finance	45	2022-06-01
404	Neha Kapoor	HR	38	2021-12-20
405	Aman Gupta	IT	41	2020-07-05

Write the output of the following SQL queries.

(i) SELECT Name, SUBSTR(Name,5) FROM Employee WHERE EmpID < 403;

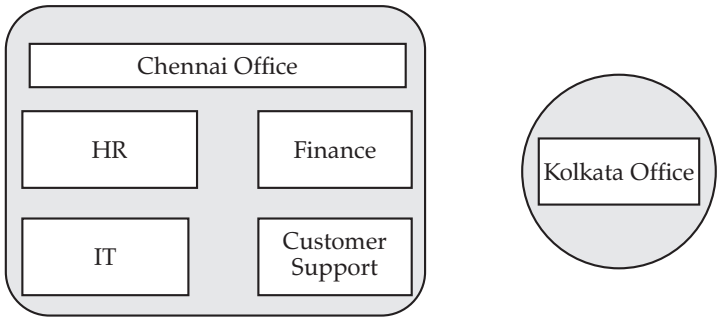
(ii) SELECT LOWER(Name) FROM Employee
WHERE MONTH(Join_Date) = 3;

(iii) SELECT AVG(Age) AS Average_Age FROM Employee;

(iv) SELECT Name, Age FROM Employee WHERE Age BETWEEN 30 AND 40;

SECTION-E

35. DEF Corp. is a global IT and financial services provider. The company's head office is located in Chennai, while its regional office is in Kolkata. The Chennai office comprises four departments: HR, Finance, IT and Customer Support.



From	To	Distance
HR	Finance	50 meters
HR	IT	100 meters
HR	Customer Support	130 meters
Finance	IT	55 meters
Finance	Customer Support	75 meters
IT	Customer Support	40 meters

Chennai↔ Kolkata Link

- Distance: 1500 kilometres

Location	Number of Computer
HR	90
Finance	45
IT	60
Customer Support	30
Kolkata Regional Office	40

Answer the following questions based on the above details:

(i) Suggest the most suitable department in the Chennai office to install the central server. Give a reason to justify your suggested location.

(ii) Draw a suitable cable-layout diagram showing wired network connectivity between the four departments in Chennai.

(iii) Which network hardware device would you recommend to connect all the computers within each department?

(iv) What type of network (LAN, MAN, or WAN) would you use to connect the Chennai head office and the Kolkata regional office?

(v) When a signal is transmitted over the cable from HR to Customer Support, it attenuates. Which device would you deploy to overcome this signal loss? **[5]**

36. Consider the DataFrame shown below:

Index	Make	Year	Price
0	Toyota	2020	20000
1	Honda	2018	18000
2	Ford	2019	22000
3	BMW	2021	35000
4	Audi	2017	30000

Write Python Statement for the following tasks:

(i) Print the last three rows of df_cars.

(ii) Add a new column named Mileage with values [15, 18, 12, 10, 20].

(iii) Delete the column Year from the DataFrame.

(iv) Rename the column Price to Cost.

(v) Display only the Make and Cost columns from the DataFrame. **[5]**

37. **(a)** Write suitable **SQL** queries for the following:

(i) Extract the first six characters from the user_code column in the Users table.

(ii) Count the number of transactions from the Trans_ID column in the Transactions table.

(iii) Display the year from the signup_date column in the Users table.

(iv) Remove leading and trailing spaces from the Street column in the Addresses table.

(v) Display today's date. **[5]**

OR

(b) Write suitable **SQL** query for the following:

(i) Count the characters in the string 'Artificial Intelligence'.

(ii) Find the position of 'i' in the Topic column of the Seminars table.

(iii) Square the Duration column in the Sessions table.

(iv) Display the average rating from the Rating column in the Reviews table.

(v) Display the total rating from the Rating column in the Reviews table.

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