SOLVED

Sample Question Paper-3

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 loc[] method can only be used to access rows, not columns, in a DataFrame. [M] [1]

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

SELECT LENGTH('Informatics'); [E] [1]

(a) 11 **(b)** 10 **(c)** 9 **(d)** 12

3. A student downloaded a paid antivirus software for free from an unknown website and began distributing it among friends. This act violates: [H] [1]

(a) Cyber Security Policy **(b)** Data Protection
(c) Intellectual Property Rights **(d)** Privacy Rights

4. Which argument should be passed to `df.to_csv()` to **avoid writing the index** to the file? [E] [1]

(a) no_index=True **(b)** index=False **(c)** index=false **(d)** index:False

5. A device that is used to **forward data** only to the intended device in a network is called: [E] [1]

(a) Hub **(b)** Modem **(c)** Switch **(d)** Repeater

6. Which SQL function will return **8** when applied 7.8 ? [M] [1]

(a) POWER() **(b)** FLOOR() **(c)** ROUND() **(d)** MOD()

7. Which of the following is **protected under copyright law**? [H] [1]

(a) Slogan of a brand **(b)** An algorithm
(c) A poem written by a student **(d)** A company name

8. Which attribute returns the **index labels** of a Pandas Series? [E] [1]

(a) series.items **(b)** series.labels **(c)** series.index **(d)** series.head()

9. Which of the following can be considered a **candidate key**? [H] [1]

(a) Only one column
(b) Any attribute or combination that uniquely identifies a row

(c) Only the primary key
(d) Only foreign key

10. Which application enables **real-time voice communication over the Internet**? **[E] [1]**
(a) FTP **(b)** VOIP **(c)** SMTP **(d)** HTTP

11. What does `AVG(salary)` compute in SQL? **[H] [1]**
(a) Maximum salary **(b)** Sum of all salaries
(c) Average of non-NULL salaries **(d)** Number of salary entries

12. Which method is used to **fill NaN values** in a Series with a specific value? **[M] [1]**
(a) fill_value() **(b)** replace() **(c)** fillna() **(d)** dropna()

13. Under the IT Act, 2000, which of the following is treated as a punishable offence? **[E] [1]**
(a) Installing licensed software **(b)** Unauthorised access to someone's computer
(c) Opening an email account **(d)** Browsing educational websites

14. Which SQL keyword is used to **arrange rows in descending order** based on a column's value? **[E] [1]**
(a) ORDER DESC **(b)** SORT DOWN
(c) ORDER BY column name DESC **(d)** GROUP DESC

15. What will `df.iloc[:3]` return? **[M] [1]**
(a) Last 3 rows of `df` **(b)** Rows from index 3 to end
(c) First 3 rows of `df` **(d)** Only row with index 3

16. Which of the following topologies has a **single point of failure** at the central node? **[E] [1]**
(a) Mesh **(b)** Tree **(c)** Ring **(d)** Star

17. Which SQL function removes **leading and trailing spaces** from a string? **[E] [1]**
(a) REMOVE() **(b)** STRIP() **(c)** TRIM() **(d)** CUT()

18. Which function returns basic statistical details like mean, std, min and max of a DataFrame? **[H] [1]**
(a) df.info() **(b)** df.describe() **(c)** df.stats() **(d)** df.summary()

19. Which function will return the smallest value in a numeric column? **[E] [1]**
(a) LOW() **(b)** SMALL() **(c)** MIN() **(d)** LEAST()

20. **Assertion (A):** The expression df.loc[2] accesses the row with index label 2 in a DataFrame.
Reason (R): The `loc[]` method is label-based, while `iloc[]` is integer-location based. **[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):** The `UPDATE` command can be used to modify the structure of an existing table in SQL.
Reason (R): `UPDATE` is a DML command used to update existing records in a table. **[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)** Explain any two ways to create a Series in Pandas with an example. **[M] [2]**

OR

(b) Define plagiarism. How can students avoid committing plagiarism in their digital work?

23. Define plagiarism. How can students avoid committing plagiarism in their digital work? **[E] [2]**

24. Given string: 'Artificial Intelligence'. Write SQL statements to:
(i) Extract 'Intel' from the string.
(ii) Display string in uppercase. **[M] [2]**

25. **(a)** What is the difference between a Web Browser and a Search Engine? **[M] [2]**

OR

(b) What is a firewall? How does it help in ensuring computer security?

26. What is a Foreign Key? How does it help in maintaining referential integrity? **[H] [2]**

27. Suggest two good cyber hygiene practices to ensure safe internet usage. **[E] [2]**

28. **(a)** Kunal is trying to create a DataFrame using a dictionary of lists but encounters an error. Identify and correct the error.

```
import pandas as pd
data = { 'Name': ['Amit', 'Riya', 'Kunal'],   'Age': [15, 14]  }
df = pd.dataframe(data)
print(df)
```

[M] [2]

OR

(b) Complete the code to display only the capital cities using index labels.Output:

```
Delhi     90
Mumbai    87
Kolkata   85
import pandas as pd
data = [90,87,85]
cities = ['Delhi','Mumbai','Kolkata']
s = pd.Series(_______, index=_______)
print(s)
```

SECTION-C

29. Kabir's school organises a 'Tech for Trees' program where students exchange old electronics for saplings.

(i) What values does this initiative promote among students?

(ii) State one benefit of integrating environmental education with technology.

(iii) Name an NGO or policy promoting e-waste awareness in India. **[M] [3]**

30. **(a)** Create a DataFrame for Cities and their Population.

City	Population
Delhi	19800000
Mumbai	20400000
Bangalore	12300000
Kolkata	14600000

[M] [3]

OR

(b) Create a Pandas Series using a dictionary to show Fruits and their Colours.

Index	Value
Apple	Red
Banana	Yellow
Kiwi	Green

31. **(i)** Create a table COURSES with the following columns:

Column Name	Data Type	Key
CourseID	Integer	Primary Key
CourseName	Varchar(40)	
Duration	Integer	

(ii) Later, add a new column Fees with data type Float(8,2).

(iii) Insert a record: 201, "Python Programming", 60, 15000.00 **[H] [3]**

32. Consider the given two tables:

Table: STUDENTS

RollNo	Name	City	Class
101	Asha	Delhi	12
102	Rohan	Mumbai	11
103	Neha	Delhi	12
104	Aarav	Pune	11
105	Kriti	Delhi	12

Table: MARKS

RollNo	Subject	Marks
101	IP	85

101	Maths	90
102	IP	78
103	Maths	95
104	IP	88
105	IP	92

Write SQL queries for:

(i) Display the average marks of students subject-wise.

(ii) Display names and cities of students who scored more than 85 in IP.

(iii) Display city-wise count of students. **[M] [3]**

SECTION-D

33. During a Python assignment, a student Neha, was asked to generate a bar chart that displays the number of hours studied by 4 students in a week:

Diagram

Student	**Hours**
Aryan	6
Bhavya	8
Chirag	5
Divya	7

Complete the following code by filling in the blanks:

```
import _____ as plt   # Statement-1
students = ['Aryan', 'Bhavya', 'Chirag', 'Divya']
hours = [6, 8, 5, 7]
plt.bar(_____, _____, label='Study Hours')  # Statement-2
plt._____('Students')  # Statement-3
plt.ylabel('Hours')
plt.title('_____')  # Statement-4
plt.legend()
plt.show()
```

[E] [4]

34. **(a)** Riya, who works as a database designer, has developed a database for a school transport. This database includes a table Bus whose column (attribute) names are mentioned below:

Rtno: Shows the unique code for the route.
AreaCovered: Area covered by each bus.
Capacity: No. of seats.
Noofstud: No. of students assigned.
Distance: Distance covered by Bus.
Transporter: Transporter name
Charges: Charges of transporter

SchoolBus

Rtno	AreaCovered	Capacity	Noofstud	Distance	Transporter	Charges
1	Vasant_kunj	100	120	10	Shivam Travels	1,00,000
2	Hauz Khas	80	80	10	Anand Travels	95,000
3	Pitampura	60	55	30	Anand Travels	60,000
4	Rohini	100	90	35	Shivam Travels	75,000
5	Yamuna Vihar	50	60	30	Anand Travels	55,000

(i) Write an SQL query to count number of school bus transporter-wise.

(ii) Write an SQL query to show transporter-wise average charges for all routes having charges more than 60,000.

(iii) Write an SQL query to show transporter-wise total number of students travelling.

(iv) Write an SQL query to show transporter-wise maximum capacity. **[H] [4]**

OR

(b) A cosmetic company has maintained a database for its company. The database includes a table name calledFashion, which stores the details of the cosmetic products along with their price and quantity.

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

(i) Select count(*) from fashion;
(ii) Select sum(Price*Qty) from fashion;
(iii) Select left(Product, 4) from fashion;
(iv) Select Max(Price) from fashion;

SECTION-E

35. XYZ is a professional consultancy company. The company is planning to set up their new offices in India with its hub at Pune. As a network adviser, you have to understand its requirement and suggest the best available solutions. Their queries are mentioned as (I) to (V) below:

Physical locations of the blocks Block to Block distance (in Metres):

From To Distance

Human Resource Conference 110

Human Resource Finance 40

Conference Finance 80

Expected number of computers to be installed in each block:

Block Computers

Human Resource 25

Finance 120

Conference 90

(i) What will be the most appropriate block, where XYZ should plan to install their server?

(ii) Draw a block diagram showing the cable layout to connect all the buildings in the most appropriate manner forefficient communication.

(iii) What will be the best possible connectivity out of the following you will suggest to connect the new setup of offices in Chennai with its London-based office.
- Satellite link
- Infrared
- Ethernet cable

(iv) Which of the following devices you will suggest to connect each computer in each of the buildings?
- Switch
- Modem
- Gateway

(v) Which type of network out of the following is formed by connecting the computers of these three blocks?
- LAN
- MAN
- WAN

[M] [5]

36. Consider the given dataframe:

DataFrame: df_books

Code	Title	Author	Price	Marks
B1	WINGS OF FIRE	APJ Abdul Kalam	350	88
B2	IGNITED MINDS	APJ Abdul Kalam	300	92
B3	THE MONK WHO SOLD...	Robin Sharma	250	79
B4	A BRIEF HISTORY OF TIME	Stephen Hawking	450	85
B5	THE ALCHEMIST	Paulo Coelho	275	90

Write the python code to execuute the following:

(i) Display books with price above 300.

(ii) Remove the column 'Author'.
(iii) Print the first 3 rows.
(iv) Rename 'Price' to 'Cost'.
(v) Display the column title. **[H] [5]**

37. **(a)** Write a suitable SQL query for the following:
(i) Display the last 3 characters of Registration_Number.
(ii) Show all owner names in uppercase.
(iii) Count how many vehicles are registered.
(iv) Display the total length of each registration number.
(v) Display owner names without extra leading/trailing spaces. **[M] [5]**

OR

(b) Write the SQL statement for the following:
(i) Display the maximum salary.
(ii) Display the average salary.
(iii) Count employees earning more than 40,000.
(iv) Display names of employees in lowercase.
(v) Show total number of employees.

❐❐❐