SOLUTIONS

Sample Question Paper-6

SECTION-A

1. True

Why? pd.DataFrame() accepts a dictionary of lists (or arrays) where keys are column names and values are lists representing data.

Why not? Because this is a basic and correct way to create a DataFrame — so marking it false would ignore Pandas' official capability.

2. **(b)** class 12 ip

Why? LCASE() (or LOWER()) converts all characters in a string to lowercase.

Why not?

(a) CLASS 12 IP → unchanged text, not lowercase.

(c) Class 12 Ip → title case, not lowercase.

(d) error → function is valid in MySQL.

3. **(c)** Reporting cyberbullying on a school portal

Why? It's ethical and legal to report harmful online behaviour.

Why not?

(a) **Sharing pirated movies** → illegal, violates copyright.

(b) **Accessing someone's email** → unauthorised access is a cybercrime.

(d) **Downloading paid apps for free** → piracy, illegal.

4. **(a)** read_csv()

Why? pd.read_csv() is the standard Pandas function to read CSV files.

Why not?

(b) **import_excel(),**

(c) **load_excel(),**

(d) **open_excel** → these functions don't exist in Pandas.

5. **(b)** Modem

Why? Modem stands for Modulator-DEModulator, which is used for dial-up/DSL connections.

Why not?

(a) **Router** → routes data between networks.

(c) **Gateway** → connects networks with different protocols.

(d) **Switch** → connects devices in a LAN.

6. **(b)** 13.8

Why? Rounds to 1 decimal place → 13.75 becomes 13.8.

Why not?

(a) 13.7 → would be truncation, not rounding.

(c) 13,

(d) 14 → whole number rounding.

7. **(c)** Copyright

Why? Copyright protects original creative works like music, songs, jingles, books, or software. The advertisement jingle is a creative work, so it is covered by copyright.

Why not?

(a) **Patent:** Protects inventions and technical processes, not songs or jingles.

(b) **Trademark:** Protects brand names, logos, and symbols, not creative works like jingles.

(d) **Trade Secret:** Protects confidential business information (like formulas or methods), not publicly shared music.

8. **(c)** head()

Why? Series.head(n) returns the first n elements.

Why not?

(a) **top()** → no such Pandas method.

(b) **begin()** → no such method.

(d) **first()** → exists for time-series index, not general Series.

9. **(b)** Only one

Why? A table can have only one primary key, but it can be composite (multiple columns).

Why not?

(a) **One or more** → incorrect, cannot have more than one.

(c) **Unlimited** → not possible.

(d) **None** → every table should ideally have one primary key.

10. **(a)** Remote Access

Why? Accessing a computer from another location via internet = remote access.

Why not?

(b) Cloud Backup → storing data online.

(c) Email → unrelated.

(d) Web Browsing → general internet use.

11. **(b)** Only students with non-NULL marks

Why? COUNT(column) ignores NULL values.

Why not?

(a) **Total number of students** → use COUNT(*).

(c) **All rows including NULLs** → false.

(d) **Error** → valid query.

12. **(c)** Aligns by index and fills unmatched values as NaN

Why? add() performs index alignment.

Why not?

(a) **Adds without considering indices** → wrong, it matches by index.

(b) **Adds only common indices** → wrong, includes all indices.

(d) **Adds values with default index** → not correct unless indices match.

13. **(c)** Information Technology Act, 2000

Why? IT Act gives legal recognition to e-records & signatures in India.

Why not? a, b, d → these names are incorrect or fictional.

14. **(b)** ORDER BY col1, col2

Why? This syntax sorts by col1, then col2 for ties.

Why not?

(a) **ORDER BY col1 OR col2** → invalid SQL.

(c) **ORDER BY (col1 + col2)** → sorts by sum, not separately.

(d) **GROUP BY** → groups rows, not sorts.

15. **(b)** Rows with indices 3 to 6

Why? loc is inclusive for both start and end.

Why not?

(a) **3 to 5** → would be slicing with iloc.

(b) **4 to 6** → wrong start.

(d) **Error** → valid operation.

16. **(b)** Mesh

Why? Mesh has multiple paths, so one failure doesn't disrupt the network.

Why not?

(a) **Star** → hub failure kills network.

(b) **Bus** → single cable failure stops all.

(c) **Bus** → duplicate option.

17. **(a)** LEFT('PYTHON', 3)

Why? LEFT returns first N characters.

Why not?

(b) **RIGHT('PYTHON', 3)** → returns last 3.

(c) **SUBSTRING('PYTHON', 4, 3)** → returns 'HON'.

(d) **FIRST()** → not valid SQL standard.

18. **(c)** True

Why? Returns Boolean True if DataFrame is empty.

Why not?

(a) **'Yes'** → not string.

(b) **0** → integer, not boolean.

(d) **False** → opposite.

19. **(b)** GROUP BY

Why? Used with COUNT, SUM, AVG, etc., to group rows.

Why not?

(a) **ORDER BY** → for sorting.

(b) **HAVING** → filters after grouping.

(d) **WHERE** → filters before grouping.

20. **(a)** Both True, R correctly explains A

Why? drop() works for both rows & columns, axis=0 → rows, axis=1 → columns.

Why not? Other options deny the correct relation.

21. **(d)** A is False, R is True

Why? Assertion: DELETE removes rows, not table. DROP TABLE removes entire table.

Reason: Other options incorrectly claim A is true.

SECTION-B

22. **(a)** Indexing in a Pandas Series is used to access individual elements using a label or position. By default, Pandas assigns integer indices starting from 0, but custom labels can also be provided.

```
import pandas as pd
data = [10, 20, 30]
index = ['Math', 'Science', 'English']
s = pd.Series(data, index=index)
print(s)
```

OR

(b) Matplotlib is a Python library used for creating visual representations of data, such as charts and graphs. It helps users quickly identify trends, patterns and outliers in data.

Chart Type: Bar Chart

A bar chart displays categorical data with rectangular bars.

Use Case Example:

To compare the sales of different products, a bar chart can be used:

```
import matplotlib.pyplot as plt
products = ['A', 'B', 'C']
sales = [100, 150, 90]
plt.bar(products, sales)
plt.title('Product Sales')
plt.show()
```

23. Copyright gives legal rights to creators over their digital content (e.g., images, code, music). It prevents unauthorised use, copying, or distribution.

Benefits to Creators:

- Retain ownership and control

- Earn income through licensing or sales
- Gain recognition for original work

Benefits to Users:

- Access to authentic content
- Clear usage guidelines
- Encourages creativity by respecting rights

24. **(i)** SELECT INSTR('Digital Communication Era', 'Comm');

(ii) SELECT LOWER('Digital Communication Era');

25. **(a)** URL (Uniform Resource Locator) is the address used to access resources on the internet.

Main Components:

Protocol: Communication method (e.g., https)

Domain: Website name (e.g., example.com)

Path: Specific page/resource (e.g., /products/index.html)

Example URL: https://www.example.com/products/index.html

- **Protocol:** https
- **Domain:** www.example.com
- **Path:** /products/index.html

OR

(b) Third-party cookies are created by domains other than the one the user is currently visiting, typically used by advertisers for tracking user behaviour across multiple sites.

Why blocked/restricted?

- Privacy concerns
- Prevent user tracking without consent
- Modern browsers aim to provide safe, private browsing experiences.

26. A Primary Key is a column (or set of columns) that uniquely identifies each record in a table.

Significance:

- Prevents duplicate entries
- Ensures that no row has a null or missing identifier
- Maintains referential integrity when used in foreign key relationships
- It guarantees that each record is uniquely and reliably identifiable.

27. Prolonged poor posture can cause various health issues, including:

- Neck and back pain from slouching or bending
- Eye strain due to improper screen distance
- Carpal tunnel syndrome from incorrect hand positioning
- Headaches and fatigue due to muscle tension
- Using ergonomic chairs, proper screen alignment and regular breaks can help reduce these problems.

25. **(a)**
```
import pandas as pd
records = [['Tom', 21], ['Jerry', 22], ['Spike', 20]]
df = pd.DataFrame(records, columns=['Name', 'Age'])
print(df)
```

OR

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

SECTION-C

29. **(i)** Electronic devices contain toxic substances like lead, mercury and cadmium. When disposed of in household bins, they can leak into soil and water, causing pollution and health hazards. Proper e-waste management ensures safe recycling and prevents environmental damage.

(ii) Lead is used in soldering circuit boards and is harmful to the nervous system and environment.

(iii) She can use Karo Sambhav, Apple Trade-In or EcoReco, which are platforms that collect and recycle old electronics responsibly.

30. **(a)**
```
import pandas as pd
subjects = pd.Series(["English", "Physics", "Chemistry", "Maths"])
marks = pd.Series([90, 75, 80, 95])
df = pd.DataFrame({"Subject": subjects, "Marks": marks})
print(df)
```

OR

(b)
```
import pandas as pd
series = pd.Series( ["Bill Gates", "Elon Musk", "Mark Zuckerberg"],
index=["Microsoft", "Tesla", "Facebook"])
print(series)
```

31. **(i)**
```
CREATE TABLE BOOKS (
ISBN VARCHAR(13) PRIMARY KEY,
Title VARCHAR(50),
Author VARCHAR(30),
PublishedOn DATE,
Price FLOAT(8,2));
```

(ii)
```
INSERT INTO BOOKS (ISBN, Title, Author, PublishedOn, Price)
VALUES ('9780132350884', 'Clean Code', 'Robert C. Martin', '2008-08-01', 499.99);
```

32. **(a)** **(i)**
```
SELECT PRODUCT.NAME, SUPPLIER.SUPPLIER_NAME
FROM PRODUCT
JOIN SUPPLIER ON PRODUCT.SUP_ID = SUPPLIER.SUP_ID;
```

(ii)
```
SELECT * FROM PRODUCT
```

WHERE PRICE > 500;

(iii) SELECT SUP_ID, SUM(PRICE) AS Total_Price
FROM PRODUCT
GROUP BY SUP_ID;

OR

(b) (i) SELECT COUNT(*) AS Present_Count
FROM ATTENDANCE
WHERE Date = '2025-07-20' AND Status = 'Present';

(ii) SELECT STUDENTS.Name
FROM STUDENTS
JOIN ATTENDANCE ON STUDENTS.StudentID = ATTENDANCE.StudentID
WHERE ATTENDANCE.Status = 'Absent';

(iii) SELECT STUDENTS.Name, ATTENDANCE.Status
FROM STUDENTS
JOIN ATTENDANCE ON STUDENTS.StudentID = ATTENDANCE.StudentID;

SECTION-D

34. **(i)** matplotlib.pyplot

(ii) books_read

(iii) ylabel

(iv) Number of Books Read by Students

34. **(a) (i)** SELECT YEAR(MIN(TRANSACTION_DATE)) FROM BLOCKCHAIN;

(ii) SELECT MONTH(MAX(TRANSACTION_DATE)) FROM BLOCKCHAIN;

(iii) SELECT * FROM BLOCKCHAIN WHERE MONTHNAME (TRANSACTION_DATE)='MAY';

(iv) SELECT COUNT(ID) FROM BLOCKCHAIN WHERE YEAR(TRANSACTION_DATE)=2022;

OR

(b) (i)

COUNT (Product)
6

(ii)

SUM (Price * Qty)
34,000

(iii)

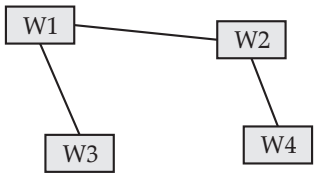
LEFT (Product,4)
FOUN
NIGH

(iv)

MAX (PRICE)
2,100

SECTION-E

35. **(i)** Star topology



(ii) **(a)** LAN

(b) WAN

(iii) **(a)** Repeater should be placed in between wings W3 to W2 and W1 to W4 as distance is more.

(b) Repeater should be placed in between wings W3 to W2 and W1 to W4 as distance is more.

(iv) Protocol: VoIP

Example to send messages instantly: WhatsApp

(v) Wireless Local Area Network (WLAN)

36. **(i)**
```
print(students['Name'])
```

(ii)
```
print(students.head(3))
```

(iii)
```
students.loc[len(students)] = [106, "Neha", 11, 91]
```

(iv)
```
print(students[students['Class'] == 12])
```

(v)
```
students_dropped = students.drop('Marks', axis=1)
print(students_dropped)
```

37. **(a) (i)** SELECT YEAR(JoinDate) AS JoinYear FROM Employees;

(ii) SELECT SUM(Quantity) AS TotalQuantity FROM Inventory;

(iii) SELECT LOWER(email) AS lower_email FROM Users;

(iv) SELECT COUNT(*) AS ElectronicsCount FROM Products WHERE Category = 'Electronics';

(v) SELECT AVG(OrderAmount) AS AvgCompletedOrder FROM Orders WHERE Status = 'Completed';

OR

(b) (i) SELECT ROUND(45.67891, 1);

(ii) SELECT SQRT(144);

(iii) SELECT INSTR('edutechplatform', 'tech');

(iv) SELECT RIGHT('SmartLearning', 4);

(v) SELECT TRIM(contact_number') AS CleanNumber FROM Customers;

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