# Delhi Public School, Howrah

**PERIODIC TEST III (2025-2026)**

**CLASS – XII**

***Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.***

**SUBJECT: INFORMATICS PRACTICES (065)**

**THEORY EXAMINATION**

**Time Allowed:- 3 Hours** **F.M.-70**

**General Instructions:**

- All questions are compulsory.
- The examination paper contains five sections, from Section A to Section E.
- Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
- Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
- Section C consists of 4 questions (29 to 32). Each question carries 3 Marks.
- Section D consists of 2 questions (33 to 34). Each question carries 4 Marks.
- Section E consists of 3 questions (35 to 37). Each question carries 5 Marks.
- There is no overall choice. However, internal choices have been provided in some questions.
- Attempt only one of the choices in such questions.
- All programming questions are to be answered using Python Language only.
- In case of MCQ, text of the correct answer should also be written.

## SECTION – A (21 X 1 = 21 Marks)

1. The default index value of a Pandas Series starts from _____.
   A) 1 B) 10 C) 0 D) -1
2. Choose the correct SQL function that returns the length of a string.
   A) COUNT() B) LENGTH() C) LEN() D) CHAR()
3. Ravi's company has offices in India, Singapore, and the USA. The organization wants to establish a network that connects all these branches across different countries so they can securely share data and communicate in real time. Which type of network should the company use?
   A) LAN B) MAN C) PAN D) WAN
4. Which Pandas function is used to read a CSV file?
   A) read.txt() B) read_file() C) read_csv() D) read_data()
5. Name the cybercrime where an attacker sends fake emails to steal credentials.
   A) Phishing B) Data Mining C) Sniffing D) Cyberstalking
6. What will be the output of: SELECT ROUND(6.7,0);
   A) 6 B) 7 C) 6.7 D) 6.0
7. The network device that is used to regenerate weak signals is _____.
   A) Hub B) Router C) Repeater D) Switch
8. The _____ command is used to sort records in SQL.
   A) ORDER BY B) SORT C) SORT BY D) ARRANGE
9. Choose the appropriate purpose of the TRIM() function in SQL.
   A) Extract substring B) Convert case C) Remove spaces D) Count characters
10. Line graphs in Python are plotted using –
    A) plt.scatter() B) plt.plot() C) plt.bar() D) plt.line()
11. Identify the correct option from the following: Series can store heterogeneous data types.
    A) True B) False C) Depends on Pandas version D) Only numeric data
12. The topology where each computer connects to a central device is _____.
    A) Bus B) Ring C) Mesh D) Star

13. Which Act governs cybercrime in India?
A) Digital Security Act, 2012 B) IT Act, 2000
C) Cyber Law Act, 2008 D) Cyber Safety Act, 2020

14. Which Pandas function is used to change the column names?
A) rename() B) change() C) modify() D) alter()

15. Digital footprint refers to _____.
A) the footprints left on digital screens B) the user activity stored online
C) the storage of digital files D) a type of malware

16. The SQL syntax to convert a string to uppercase is _____.
A) TOUPPER() B) CAPITAL() C) UPPER() D) CONVERT()

17. A benefit of FOSS is:
A) Paid license required B) No community support
C) Closed-source distribution D) Freely accessible and modifiable

18. The COUNT(*) funtion in SQL is used to_____.
A) count only the numeric values B) count the rows including NULL
C) the sum column values D) count the characters in a string

19. df.tail(3) displays –
A) Random 3 rows B) Only index values C) First 3 rows D) Last 3 rows

**Q-20 and Q-21 are Assertion (A) and Reason (R) Type questions. Choose the correct option as:**
**(A) Both A and R are True, and R is the correct explanation of A.**
**(B) Both A and R are True, but R is NOT the correct explanation of A.**
**(C) A is True, but R is False.**
**(D) A is False, but R is True.**

20. Assertion (A): A Local Area Network (LAN) covers a small geographical area such as a building, school, or office.
Reason (R): The Internet is an example of a LAN.

21. Assertion (A): A histogram is used to represent continuous numerical data.
Reason (R): A histogram displays data using adjacent rectangular bars.

## SECTION – B (2 X 7 = 14 Marks)

22. (i) What is Boolean Indexing in Pandas? Give an example. 2

**OR**

(ii) What is Label-based Indexing in Pandas? Write a Python statement to select rows based on labels using loc().

23. Tarini uses a health tracking app that stores sensitive details such as her medical reports, daily activity, heart rate, and personal profile. She is worried that this information might be shared with third-party companies without her consent. Explain the concept in brief that ensures her personal information is protected and not misused? 2

24. (a) Write SQL query to display the (a) name of the day and (b) extract the month number from '2026-02-12'.
(b) What is the use of the NOW() function in SQL? Give an example. 2

25. (i) Sanya wants to submit her practical file digitally to her teacher through email. In order to do the same she need to open the website of the email platform using the correct URL. State the significance of a URL in accessing web resources. 2

**OR**

(ii) Rahul wants to conduct a free voice meeting with his cousin living in Canada using the internet instead of traditional phone calls. Explain how VoIP enables such communication. Also, state one benefit of using VoIP over conventional telephony.

26. Given the following Series representing the number of books issued by students in a library: 2

| Student | Books Issued |
|---|---|
| Aarav | 3 |
| Neha | 5 |

| | |
|---|---|
| Rohan | 2 |
| Simran | 4 |

(a) Write a Python program using *Pandas* to create the above Series using a dictionary and display it. (1.5)
(b) Write a Python statement to display only the books issued by Rohan. (0.5)

27. A school wants to analyse the performance of students in different subjects. The school database stores records in a table named Marks with the columns StudentName, Subject, and Score as per the table name MARKS shown below. The principal wants to know the average marks scored in each subject to compare subject-wise performance.

**TABLE: MARKS**

| StudentName | Subject | Score |
|---|---|---|
| Aarav | Maths | 88 |
| Neha | Maths | 92 |
| Rohan | Science | 81 |
| Simran | Science | 89 |
| Aisha | English | 75 |
| Kabir | English | 84 |
| Zoya | Maths | 79 |
| Riya | Science | 90 |

Write an SQL query using the GROUP BY clause to generate subject-wise average marks. Explain how the GROUP BY clause helps in such analysis. 2

28. (i) Write the output of the following code:

```
import pandas as pd
names = pd.Series(['Ishaan', 'Meera', 'Tanvi'])
grades = pd.Series(['A', 'B', 'A'])
data = {'Name': names, 'Grade': grades}
df = pd.DataFrame(data)
df.rename(columns={'Grade': 'Result'}, inplace=True)
print(df)
```

**OR**

(ii) Write the output of the following code:

```
import pandas as pd
state = pd.Series(['Punjab', 'Haryana', 'Bihar', 'Assam'])
population = pd.Series([3, 2.8, 1.7, 1.5])
data = {'State': state, 'Population': population}
df = pd.DataFrame(data)
df.drop(index=[2, 3], inplace=True)
print(df)
```

## SECTION – C (3 X 4 = 12 Marks)

29. Arjun notices unusual activities on his social media account—posts appearing that he never made. His friend Riya receives a message from someone pretending to be Arjun and asking for her bank details. Meanwhile, another classmate, Mehak, is repeatedly receiving hurtful messages online from anonymous accounts. Based on the situations described, identify and explain the types of cybercrimes involved. 3

30. (i) The following table shows the details of three products: 3

| Product | Price | Quantity |
|---|---|---|
| Pen | 10 | 50 |
| Notebook | 45 | 20 |
| Eraser | 5 | 100 |

Using the above data,

(a) Write a Python program to create a DataFrame using a list of dictionaries.

(b) Rename the column "Quantity" to "Stock" and display the updated DataFrame.

**OR**

(ii) The following table shows the details of employees working in a company:

| Name | Department | Salary |
|---|---|---|
| Ayan | HR | 52000 |
| Mehak | IT | 68000 |
| Rishi | Finance | 47000 |

Using the above data,

(a) Write a Python program to create a DataFrame using a list of dictionaries.

(b) Delete the column "Department" from the DataFrame and display the updated DataFrame.

31. A company maintains employee information in a table named EMP, as shown below: 3

**Table: EMP**

| EmpID | Name | Department | Salary |
|---|---|---|---|
| 101 | Aarav | IT | 55000 |
| 102 | Nisha | HR | 48000 |
| 103 | Rohan | IT | 62000 |
| 104 | Meera | Finance | 53000 |
| 105 | Kabir | IT | 60000 |

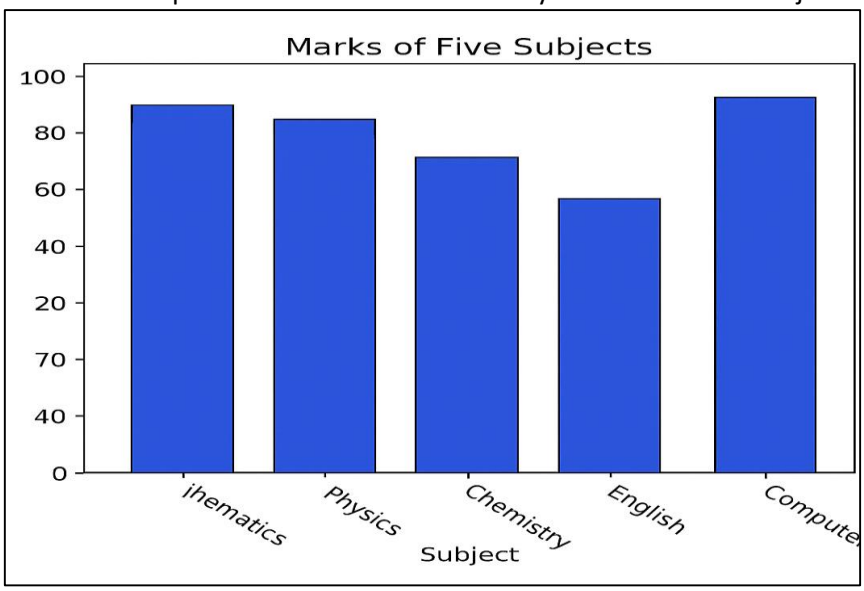
Using the above table, write SQL queries for the following:

(a) Display the names of all employees in uppercase.

(b) Count the number of employees working in the IT department.

(c) Display the Name and Salary of employees, sorted by salary in descending order.

32. (i) The bar graph shown below represents the marks obtained by a student in five subjects: 3




Write a Python program using Matplotlib to generate the same bar graph. The program should:

(a) Plot the marks of the five subjects shown in the graph.

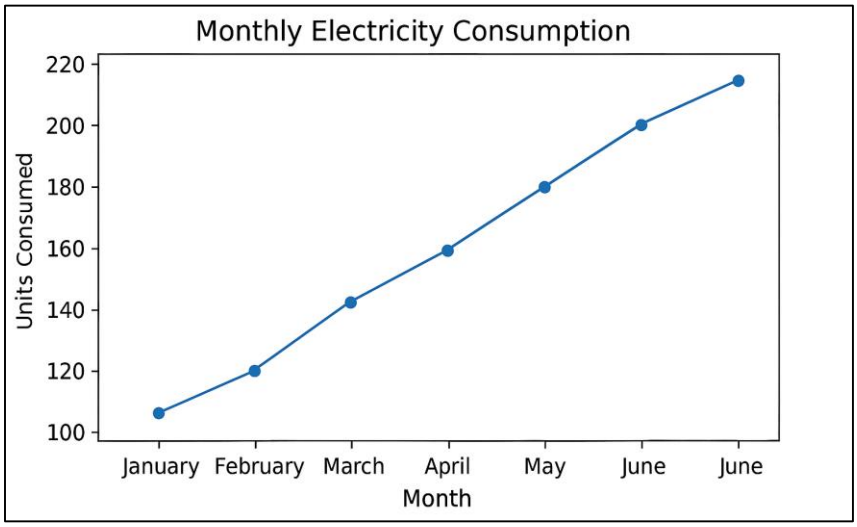
(b) Label the x-axis as “Subject” and the y-axis as “Marks”.

(c) Ensure the y-axis scale ranges from 0 to 100 as shown in the graph.

(d) Display the bar graph.

**OR**

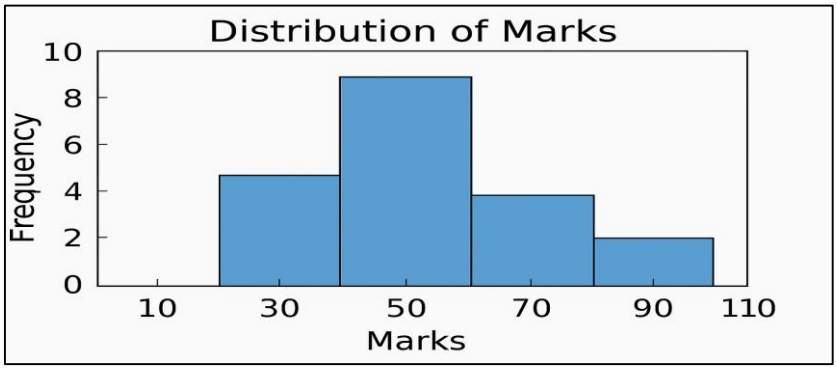
(ii) The line chart shown below represents the **monthly electricity consumption (in units)** of a household over six months:




Write a Python program using Matplotlib to plot the line chart.
Your program should:
(a) Plot the monthly consumption values as a line chart.
(b) Label the x-axis as "Month" and the y-axis as "Units Consumed".
(c) Add an appropriate title.
(d) Display the chart.

**SECTION – D (4 X 2 = 8 Marks)**

33. The histogram shown below represents the **distribution of marks scored by students** in a test: 4




Using the given histogram, **fill in the blanks** in the incomplete Python program to generate the same histogram.

```
import _________________ as _______          # (a)
marks = ____________________________         # (b)
plt.hist(_________, bins=___________)        # (c)
plt.xlabel('_________________')              # (d)
plt.ylabel('_________________')              # (e)
plt.title('_________________')               # (f)
plt.show()
```

34. (i) Ritika, a database administrator, has created a table Employee as shown below: 4

**Table : Employee**

| EmpID | EmpName | Department | Salary | Joining_Date |
|---|---|---|---|---|
| 201 | Arjun Mehta | HR | 52000 | 2021-07-12 |
| 202 | Sneha Kapoor | IT | 68000 | 2020-11-03 |
| 203 | Mohit Sharma | Finance | 47000 | 2019-03-15 |
| 204 | Diya Nair | IT | 75000 | 2022-01-25 |
| 205 | Raghav Singh | Marketing | 61000 | 2021-04-19 |

Write suitable SQL queries for the following:

(a) Display the EmpName and Department of all employees, with both fields in lowercase, sorted in descending order of Salary.

(b) Display the EmpID along with the year in which each employee joined the company.

(c) Find the total salary expenditure of the company (sum of salaries of all employees).

(d) Display the Department and the number of employees working in each department.

**OR**

(ii) Rohan, who works as a database manager, has created a table **ORDERS** as shown below:

| OrderID | CustomerName | City | Amount | Order_Date |
|---|---|---|---|---|
| 501 | Aarav Khanna | Delhi | 1200 | 2022-05-10 |
| 502 | Meera Joshi | Mumbai | 1850 | 2022-03-22 |
| 503 | Riya Sen | Kolkata | 900 | 2021-12-18 |
| 504 | Kabir Malhotra | Delhi | 2400 | 2022-08-05 |
| 505 | Siya Menon | Mumbai | 1500 | 2021-11-02 |

Write the OUTPUT of the following SQL queries:

(a) SELECT UPPER(CustomerName), City FROM ORDERS WHERE Amount > 1500;

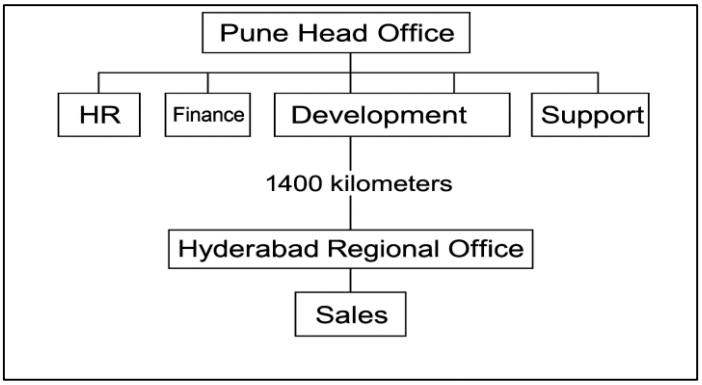
(b) SELECT OrderID, MONTH(Order_Date) FROM ORDERS WHERE City = 'Delhi';

(c) SELECT City, AVG(Amount) FROM ORDERS GROUP BY City;

(d) SELECT CustomerName, Amount FROM ORDERS ORDER BY Amount DESC;

## SECTION – E (5 X 3 = 15 Marks)

35. **TechMax Solutions** is an IT consulting company with its **Head Office in Pune** and a **Regional Office in Hyderabad**. The Pune office has four departments: **HR, Finance, Development, and Support**. 5




**Distances between departments and offices**

| Departments / Offices | Distance |
|---|---|
| HR to Finance | 75 m |
| HR to Development | 110 m |
| HR to Support | 130 m |
| Finance to Development | 55 m |
| Finance to Support | 95 m |
| Development to Support | 40 m |
| Pune Office to Hyderabad Office | 1400 km |

**Number of computers in each department**

| Location / Department | No. of Computers |
|---|---|
| HR | 60 |
| Finance | 35 |
| Development | 100 |
| Support | 25 |
| Hyderabad Office | 45 |

As a network consultant, answer the following questions:

(a) Which department in the Pune office is the most suitable for installing the main server? Justify your answer.

(b) Draw a cable layout diagram showing the wired connectivity among all departments in the Pune office.
(c) Suggest a networking device that should be used to connect all computers within each department with reason.
(d) Which type of network (LAN / MAN / WAN) should be used to connect the Pune Head Office with the Hyderabad Regional Office and why?
(e) When the signal travels from the HR department to the Support department, it weakens due to distance. Which device should be used to boost the signal strength?

36. Consider the following DataFrame df, which stores student information: 5

| | Name | Course | Marks |
|---|---|---|---|
| 0 | Aarav Jain | Python | 88 |
| 1 | Neha Kapoor | AI | 92 |
| 2 | Rohan Das | Python | 76 |
| 3 | Simran Kaur | Data Sci | 81 |
| 4 | Kunal Mehra | AI | 95 |

Write Python statements for the following tasks:
(a) Create the DataFrame df using the data given above.
(b) Add a new column named "Grade" with values ["A", "A+", "B", "B+", "A+"].
(c) Delete the column "Marks" from the DataFrame.
(d) Rename the column "Course" to "Subject".
(e) Display only the Name and Grade columns of the DataFrame.

37. (i) Write suitable SQL queries for the following: 5
(a) To extract the last four characters from the emp_code column in the Employees table.
(b) To display the total number of entries in the Sale_ID column of the Sales table.
(c) To display the month from the invoice_date column of the Invoices table.
(d) To display the Email column from the Clients table after converting all characters to lowercase.
(e) To display the current date and time.

**OR**

(ii) Write suitable SQL queries for the following:
(a) To count the number of words in the string 'Artificial Intelligence Basics'.
(b) To find the position of the substring 'Tech' in the Company_Name column of the Vendors table.
(c) To calculate the cube of the values in the Quantity column of the Orders table.
(d) To display the maximum marks from the Score column of the Results table.
(e) To display the minimum salary from the Salary column of the Employees table.