

CBSE Class 12 Informatics Practices 2025 - Set 4 (90)

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) This paper contains 37 questions. All questions are compulsory.
- (ii) Attempt one alternative wherever an internal choice is provided.
- (iii) Section A: Questions 1 to 21 carry 1 mark each.
- (iv) Section B: Questions 22 to 28 carry 2 marks each.
- (v) Section C: Questions 29 to 32 carry 3 marks each.
- (vi) Section D: Questions 33 to 34 carry 4 marks each.
- (vii) Section E: Questions 35 to 37 carry 5 marks each.
- (viii) Answer programming questions using Python.

Section A

1. State whether the following statement is True or False:

In Python, we cannot create an empty DataFrame.

- (A) True (B) False
(C) Cannot be determined (D) None of the above

2. What will be the output of the following SQL command?

```
SELECT MONTHNAME( '2024-08-02' );
```

- (A) 08 (B) 02
(C) February (D) August

3. Temporary data files stored by websites in our computer can be used to track our online activities and also to personalize browsing experience. These files are known as:

- (A) Plug-ins (B) Add-ons
(C) Cookies (D) Bookmarks

4. Which of the following is not an aggregate function in SQL?

- (A) COUNT(*) (B) MIN()
(C) LEFT() (D) AVG()

5. Raheem created a unique computer software and wants to protect his creation from being copied or used without his permission. He is considering to apply for legal protection. Which type of intellectual property protection should Raheem apply for, to safeguard his software?

- (A) Copyright (B) Plagiarism
(C) Trademark (D) Lease

6. What is the default index type for a Pandas Series if not explicitly specified?

- (A) String (B) List
(C) Numeric (D) Boolean

7. In Python which function of matplotlib library is used to save a plot?

- (A) save() (B) saveplot()
(C) export() (D) savefig()

8. State whether the following statement is True or False:

The MOD() function in SQL returns the quotient of division operation between two numbers.

- (A) True (B) False
(C) Cannot be determined (D) None of the above

9. Which of the following data structure is used for storing one-dimensional labelled data in Python Pandas?

- (A) Integer (B) Dictionary
(C) Series (D) DataFrame

10. Priya received an email that appeared to be from her bank, asking her to update her account information by clicking on a link. She clicked the link to enter her details, but immediately after, some amount was debited from her account. What type of cybercrime did Priya fall victim to?

- (A) Cyber stalking (B) Phishing
(C) Fishing (D) Cyber bullying

11. Which SQL function calculates a^b ?

- (A) MOD() (B) POWER()
(C) RAISE() (D) ROUND()

12. Which protocol is used while communicating through video calls on the Internet?

- (A) Video Over Internet Protocol (B) Voice Over Internet Protocol
(C) Internet Protocol (D) Video Audio Over Internet Protocol

13. Which of the following Python statements will be used to select a specific element having index as points, from a Pandas Series named ser?

- (A) ser.element(points) (B) ser.select (points)
(C) ser[points] (D) ser.show[points]

14. Excessive screen time and poor posture can lead to:

- (A) Faster Internet Speeds (B) Eye strain and other health issues
(C) Better vision and bone density (D) Improved physical health

15. Which of the following libraries defines an ndarray in Python?

- (A) pandas (B) numpy
(C) matplotlib (D) scipy

16. With respect to SQL, match the function given in column-II with categories given in column-I:

	I		II
(i)	Math function	(a)	COUNT()
(ii)	Aggregate function	(b)	ROUND()
(iii)	Date function	(c)	RIGHT()
(iv)	Text function	(d)	YEAR()

- (A) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b) (B) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)
(C) (i)-(d), (ii)-(b), (iii)-(a), (iv)-(c) (D) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)

17. Which of the following Python statements is used to change a column label in a DataFrame, df?

- (A) df = df.rename({old_name : new_name}, axis='columns')
(B) df = df.rename(old_name, new_name), axis='columns'
(C) df = df.change_name(old_name, new_name, axis='bar')
(D) df = df.update({old_name : new_name}, axis='bar')

18. In Python Pandas, DataFrame._____[] is used for label indexing with DataFrames.

- (A) label (B) index
(C) labindex (D) loc

19. Every web page on the Internet has a unique address. This address is known as:

- (A) Domain Name (B) Protocol
(C) Uniform Resource Locator (D) Network Topology

20. Assertion (A): The drop() method in Pandas can be used to delete rows and columns from a DataFrame.

Reason (R): The axis parameter in the drop() method specifies whether to delete rows (axis=0) or columns (axis=1).

- (A) Both Assertion (A) and Reason (R) are True and Reason (R) is the correct explanation for Assertion (A). (B) Both Assertion (A) and Reason (R) are True and Reason (R) is not the correct explanation for Assertion (A).
(C) Assertion (A) is True and Reason (R) is False. (D) Assertion (A) is False, but Reason (R) is True.

21. Assertion (A): The ROUND() function in SQL can be used to round off a number to a specified number of decimal places.

Reason (R): The ROUND() function is a string function that accepts character values as input and returns numerical values as output.

- (A) Both Assertion (A) and Reason (R) are True and Reason (R) is the correct explanation for Assertion (A). (B) Both Assertion (A) and Reason (R) are True and Reason (R) is not the correct explanation for Assertion (A).
(C) Assertion (A) is True and Reason (R) is False. (D) Assertion (A) is False, but Reason (R) is True.

Section B

22(a). Mention any two main points of difference between Series and DataFrame of Python Pandas.

OR

22(b). Explain how we can access elements of a series using slicing. Give an example to support your answer.

23. A small tech startup, is considering using open source software to develop their new project management tool. They are evaluating the benefits and potential challenges of adopting open source solutions.

(i) Identify one key benefit of using open source software for the development of project management tool.

(ii) Give any two examples of open source software.

24. Consider the string, "Informatics Practices". Write suitable SQL queries for the following:

(i) To convert the entire string to uppercase.

(ii) To display the total number of characters in the given string.

25(a). Give any two points of difference between Static web page and Dynamic web page.

OR

25(b). Describe the role of a router in a network.

26. What is a Database Management System (DBMS)? Mention any two examples of DBMS.

27. Give any two impacts on environment that are caused when e-waste is carelessly thrown or dumped in landfills or dumping grounds.

28(a). Rohit is trying to create a Pandas Series from scalar values. His code has some mistakes. Rewrite the correct code and underline the corrections made.

```
import pandas
data = [50, 15, 40]
series = pd.series(data, Index=['x', 'y', 'z'])
Print(series)
```

OR

28(b). Complete the given Python code to generate the following output:

	COLOUR	NAME	QTY
0	Red	Apple	10
1	Blue	Berry	15
2	Green	Guava	20

```
import _____ as pd
data=[{'COLOUR':'Red','NAME':'Apple',
'QTY':10},
{'COLOUR':'Blue','NAME':'Berry',
'QTY':15},
{_____, 'NAME' : 'Guava', 'QTY':20}]
df=pd.DataFrame(_____)
print(_____)
```

Section C

29. Ravi is a student studying in grade 12. He frequently uses the internet for various activities such as social networking, online shopping, and to research for school projects. Recently, he noticed that he receives targeted advertisements based on his browsing history and is concerned about his digital footprint. Additionally, Ravi has encountered instances of cyberbullying and is unsure how to handle them. Help Ravi by answering the following questions:

- What are digital footprints, and how are they created?
- Write any two net etiquettes that Ravi should follow to ensure respectful and responsible online behavior.
- How can Ravi protect himself from cyberbullying? Mention any one protective measure.

30(a). Write a Python program to create the following DataFrame using a Dictionary of Series:

	City	State
0	Mumbai	Maharashtra
1	Dehradun	Uttarakhand
2	Bengaluru	Karnataka
3	Hyderabad	Telangana

OR

30(b). Write a Python program to create a Pandas Series as shown below from an ndarray containing the numbers 10, 20, 30, 40, 50 with corresponding indices 'A', 'B', 'C', 'D', 'E'.

A	10
B	20
C	30
D	40
E	50

31(i). Write the SQL statement to create a table, Customer with the following specifications:

Table:Customer

Column Name	Data Type	Key
CID	Int	Primary Key
FName	Varchar(20)	
LName	Varchar(20)	
Age	Int	

31(ii). Write the SQL query to display all records in descending order of LName from the Table Customer.

32(a). Given the following tables:

Table: STUDENTS

S_ID	NAME	AGE	CITY
1	Rahul	20	Delhi
2	Priya	22	Mumbai
3	David	21	Delhi
4	Neha	23	Bengaluru
5	Khurshid	22	Delhi

Table: GRADES

S_ID	SUBJECT	GRADE
1	Math	A
2	English	B
3	Math	C
4	English	A
5	Math	B

Write SQL queries for the following:

- To display the number of students from each city.
- To find the average age of all students.
- To list the names of students and their grades.

OR

32(b). Consider the following tables:

Table 1: PRODUCTS

This table stores the basic details of the products available in a shop.

PID	PName	Category
201	Laptop	Electronics
202	Chair	Furniture
203	Desk	Furniture
204	Smartphone	NULL
205	Tablet	Electronics

Table 2: SALES

This table records the number of units sold for each product.

SaleID	PID	UnitsSold
301	201	50
302	202	100
303	203	60
304	204	80
305	205	70

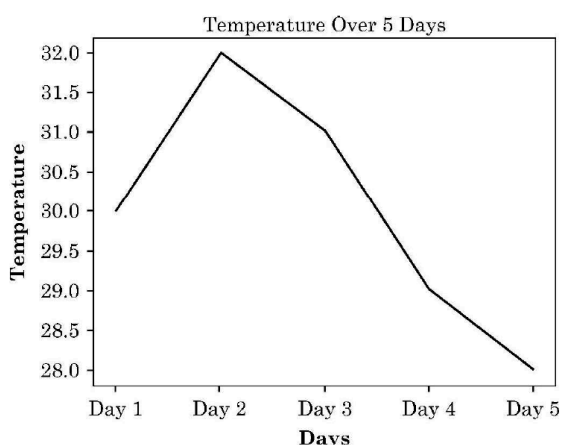
Write SQL queries for the following:

- To delete those records from table SALES whose UnitsSold is less than 80.
- To display names of all products whose category is not known.
- To display the product names along with their corresponding units sold.

33. Gurkirat has to fill in the blanks in the given Python program that generates a line plot as shown below. The given line plot represents the temperature (in degree Celcius) over five days as given in the table:

Days	Temperature
Day 1	30
Day 2	32
Day 3	31
Day 4	29
Day 5	28

33. (continued)



```
import _____ as plt # Statement-1
days = ['Day 1', 'Day 2', 'Day 3', 'Day 4', 'Day 5']
temp = [30, 32, 31, 29, 28]
plt.__(days, temp) # Statement-2
plt.xlabel('_____') # Statement-3
plt.ylabel('Temperature')
plt.title('_____') # Statement-4
plt.show()
```

Write the missing statements according to the given specifications:

33. (continued)

(i) Write the suitable code to import the required module in the blank space in the line marked as Statement-1.

(ii) Fill in the blank in Statement-2 with a suitable Python function name to create a line plot.

(iii) Refer to the graph shown and fill in the blank in Statement-3 to display the appropriate label for x-axis.

(iv) Refer to the graph shown and fill in the blank in Statement-4 to display the suitable chart title.

34(a). An educational institution is maintaining a database for storing the details of courses being offered. The database includes a table COURSE with the following attributes:

C_ID: Stores the unique ID for each course.

C_NAME: Stores the course's name.

INSTRUCTOR: Stores the name of the course instructor.

DURATION: Stores the duration of the course in hours.

Table : COURSE

C_ID	C_NAME	INSTRUCTOR	DURATION
C101	Data Structures	Dr. Alok	40
C102	Machine Learning	Prof. Sunita	60
C103	Web Development	Ms. Sakshi	45
C104	Database Management	Mr. Suresh	50
C105	Python Programming	Dr. Pawan	35

Write SQL queries for the following:

- To add a new record with following specifications: C_ID: C106, C_NAME: Introduction to AI, INSTRUCTOR: Ms. Preeti, DURATION: 55
- To display the longest duration among all courses.
- To count total number of courses run by the institution.
- To display the instructors' name in lower case.

OR

34(b). Ashutosh, who is a manager, has created a database to manage employee records. The database includes a table named EMPLOYEE whose attribute names are mentioned below:

EID: Stores the unique ID for each employee.

EMP_NAME: Stores the name of the employee.

DEPT: Stores the department of the employee.

SALARY: Stores the salary of the employee.

JOIN_DATE: Stores the employee's joining date.

Table : EMPLOYEE

EID	EMP_NAME	DEPT	SALARY	JOIN_DATE
E01	ARJUN SINGH	SALES	75000	2019-11-01
E02	PRIYA JAIN	ENGINEERING	85000	2020-05-20
E03	RAVI SHARMA	MARKETING	60000	2018-08-14
E04	AYESHA	NULL	50000	2021-01-10
E05	RAHUL VERMA	FINANCE	40000	2017-06-25

Write the output of the following SQL Queries:

- Select SUBSTRING(EMP_NAME, 1, 5) from EMPLOYEE where DEPT = 'ENGINEERING';
- Select EMP_NAME from EMPLOYEE where month(JOIN_DATE) = 8;
- Select EMP_NAME from EMPLOYEE where SALARY > 60000;
- Select count(DEPT) from EMPLOYEE;

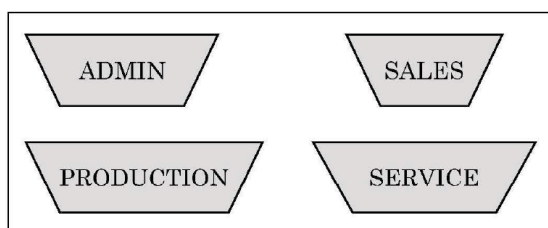
Section E

35. XYZ Technologies, Hyderabad is a company that deals with data science and AI projects. They have different divisions ADMIN, SALES, PRODUCTION and SERVICE.

The layout of the Hyderabad branch is:

The management wants to connect all the divisions as well as the computers of each division (ADMIN, SALES, PRODUCTION and SERVICE).

Distance between the divisions are as follows:



ADMIN to SALES	69m
ADMIN to PRODUCTION	84m
ADMIN to SERVICE	60m
SALES to PRODUCTION	110m
SALES to SERVICE	135m
PRODUCTION to SERVICE	90m

Number of computers in each division:

35. (continued)

Division	Number of Computers
ADMIN	40
SALES	75
PRODUCTION	120
SERVICE	20

Based on the above specifications, answer the following questions:

- (i) Suggest the topology and draw the most suitable cable layout for connecting all the divisions in the Hyderabad office.
- (ii) XYZ Technologies is having its head office in USA. Out of LAN, MAN and WAN, which kind of network will be created to connect Hyderabad office with USA Office? Justify your answer.
- (iii) Suggest the division for the placement of server. Explain the reason for your selection.
- (iv) Suggest the placement of Switch/Hub with justification.
- (v) Where will a repeater be placed in the suggested network layout? Justify your answer.

36. Consider the DataFrame Doctor shown below:

	DID	Name	Department	Fee
0	101	Dr. Joe	ENT	1500
1	102	Dr. Salma	UROLOGY	1600
2	103	Dr. Jeet	ORTHO	1550
3	104	Dr. Neha	ENT	1200
4	105	Dr. Vikram	ORTHO	1700

Write suitable Python statements for the following:

- (i) To print the last three rows of the DataFrame Doctor.
- (ii) To display the names of all doctors.
- (iii) To add a new column 'Discount' with value of 200 for all doctors.
- (iv) To display rows with index 2 and 3.
- (v) To delete the column 'Department'.

37(a). Write SQL query for the following:

- (i) To display sum total of all the values of the Score column, from STUDENTS table.
- (ii) To display the first five characters of the Name column from STUDENTS table.
- (iii) To display the values of Name column from the STUDENTS table, after removing the trailing spaces.
- (iv) To retrieve the lowest score from the Score column of GRADES table.
- (v) To increase the fee of all students by 100, in the STUDENTS table. (The name of the column is FEE)

OR

37(b). Write SQL queries for the following:

- (i) To calculate the square of 15.
- (ii) To round the number 456.789 to the nearest integer.
- (iii) To display the position of first occurrence of 'com' in the string 'mycommercial.com'.
- (iv) To display the name of the day for the date '2024-11-07'.
- (v) To display the current date and time.

- End of Question Paper -