# SAMPLE PAPER – 2
# SUBJECT: INFORMATICS PRACTICES

**SuperNova-LearnPython**, a YouTube channel dedicated to helping students to learn Python and computer science concepts.

The channel covers various topics related to computer science, including ***Python programming, data file handling, computer networking***, ***SQL*** and many more.

If you're looking for video descriptions, notes, assignments, and previous years' question papers related to Python and computer science for class 11 and 12, I recommend checking out the **SuperNova-LearnPython** channel on YouTube.

You can find the channel here[1].

Happy learning! .

**Please like, Subscribe and share the Channel**

# SAMPLE PAPER – 2

Code: Learnpython4cbse-2/5(25CBSE02)

## INFORMATICS PRACTICES 12TH (CODE 065)

**General Instructions:**

**Time: 3 Hrs.** **Max. Marks: 70**

1. Please check this question paper contains 37 questions.
2. All questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
3. The paper is divided into 5 Sections- A, B, C, D and E.
4. Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
5. Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
6. Section C consists of 4 questions (29 to 32). Each question carries 3 Marks.
7. Section D consists of 2 case study type questions (33 to 34). Each question carries 4 Marks.
8. Section E consists of 3 questions (35 to 37). Each question carries 5 Marks.
9. All programming questions are to be answered using Python Language only.
10. In case of MCO, text of the correct answer should also be written.

| | **SECTION A** [21x1= 21] | |
|---|---|---|
| **1** | State whether the following statement is True or False:<br>The dtype attribute of a Pandas Series can be used to check the data type of the elements in the Series | **1** |
| **2** | The HAVING clause<br>(a) acts exactly like WHERE clause.<br>(b) acts like a WHERE clause but is used for columns rather than groups.<br>(c) acts like a WHERE clause but is used for groups rather than rows.<br>(d) acts like a WHERE clause but is used for rows rather than columns. | **1** |
| **3** | The fastest transmission media among the following is<br>(a) Twisted pair (b) Telephone cable<br>(c) Optical fibre cable (d) Coaxial cable | **1** |
| **4** | What type of value is returned by the function COUNT()?<br>(a)integer (b) Date/Time<br>(c) String (d) None of these | **1** |

| | | |
|---|---|---|
| **5** | Which of the following is not an e-Waste?<br>(a) Motherboard (b) Broken Monitor<br>(c) Broken printer (d) Iron rods | **1** |
| **6** | Which of the following Python statements can be used to select a column column_name from a DataFrame df?<br>(a) df.getcolumn('column_name') (b) df['column_name'\|<br>(c) df.select('column_name') (d) df(column_name) | **1** |
| **7** | Which plot is also known as the 'Whisker plot' in Matplotlib?<br>(a) Bar (b) Pie<br>(c) Histogram (d) Box plot | **1** |
| **8** | State whether the following statement is True or False:<br>In SQL, the JOIN operation always combines all the rows from both tables involved. | **1** |
| **9** | CSV files are popular because they are<br>(a) capable of storing large amount of data<br>(b) easier to create<br>(c) prefered export and import format for databases and spread sheets<br>(d) All the above | **1** |
| **10** | John was using an antivirus software for free for a month, one morning he found the software stopped working saying that it needs to be bought. What category of software does it belong to?<br>(a) Proprietary software (b) Free software<br>(c) Freeware software (d) Shareware software | **1** |
| **11** | Fill in the Blank<br>A primary key uniquely identifies_____in a relational database.<br>(a) Rows (b) Columns<br>(c) Tables (d) Databases | **1** |
| **12** | The ..... function in SQL is used to calculate the average value of a numeric column,<br>(a) SUM (b) AVG<br>(c) COUNT (d) MAX | **1** |
| **13** | If you want to add a new column 'B' with values [1, 2, 3, 4] to an existing DataFrame df, which code snippet should you use?<br>(a) df['B'J = [1, 2, 3, 4] (b) df.addColumnfB', (1, 2, 3, 4])<br>(c) df.newColumn('B', [1, 2, 3, 4]) (d) df.appendColumn('B', [1, 2, 3, 4\|) | **1** |

**14** Online posting of rumours, giving threats online, posting the victim's personal information, comments aimed to publicly ridicule a victim is termed as **1**

(a) Cyber bullying (b) Cyber crime

(c) Cyber insult (d) All of these

**15** Which of the following is not correct regarding series? **1**

(a) They are one dimensional. (b) Their size can be increased later.

(c) The index property displays its indices. (d) All are correct.

**16** Match the following SQL operators with their purposes: **1**

| **SQL Operator** | **Purpose** |
|---|---|
| P. LIKE | 1. Compares for equality. |
| Q. BETWEEN | 2. Selects values within a range. |
| R. = | 3. Checks for a pattern. |
| S. NOT | 4. Negates a condition. |

(a) P-3, Q-2, R-l, S-4 (b) P-4, Q-3, R-2, S-l

(c) P-1, Q-4, R-3, S-2 (d) P-2, Q-3, R-4, S-l

**17** Fill in the Blank **1**

A_____join returns all rows when there is a match in either of the tables.

(a) INNER (b) OUTER

(c) LEFT (d) CROSS

**18** Which color is the default color of a matplotlib plot? **1**

(a) Red (b) Green

(c) Blue (d) Black

**19** Which protocol is used to assign IP addresses dynamically to devices on a network? **1**

(a) DMS (b)DHCP

(c) IP (d) TCP

**Directions (Q. Nos. 20 and 21)** are Assertion (A) and Reason (R) Type the correct option as:

(a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A)

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A)

(c) Assertion (A) is True, but Reason (R) is False

(d) Assertion (A) is False, but Reason (R) is True

| | | |
|---|---|---|
| **20** | Assertion (A) Pandas is a library of Python.<br>Reason(R) Yes, we import pandas and can use functions of pandas like Seriesf) and DataFramef) etc in Python. | **1** |
| **21** | Assertion (A) In SQL, INSERT INTO' is a Data Definition Language (DDL) command.<br>Reason (R) DDL commands are used to create, modify, or remove database structures, such as tables. | **1** |
| | **SECTION B** **[7x2= 14]** | |
| **22** | Write python code to do the following based on the given dataframe DF: | **2** |

| Rollno | Name | Age | Marks |
|---|---|---|---|
| 11 | Aruna | 18 | 68 |
| 12 | Mohini | 14 | 47 |
| 13 | Kiya | 13 | 78 |
| 14 | Lakshami | 16 | 87 |
| 15 | Ravisha | 14 | 60 |

(a) display students having marks more than 50

(b) display name and marks column only

**OR**

Write a program to create a series object using a dictionary that stores the number of boys in each from IX to XII your school.

Note: Assume four class names are Ninth, Tenth, Eleventh and Twelfth having 10, 20, 12, 16 boys respectively and pandas library has been imported as pd.

| | | |
|---|---|---|
| **23** | How can we prevent identity thefts? | **2** |
| **24** | Anjali writes the following commands with respect to a table employee having fields, empno, name, department, commission.<br>Command1: Select count (*) from employee;<br>Command2: Select count (commissi on) from employee;<br>She gets the output 4 for the first command but get an output 3 for the second command. Explain the output with justification. | **2** |
| **25** | What is the web browser? Name any four web browsers.<br>**OR**<br>Discuss the structure of an E-mail message in brief. | **2** |
| **26** | Differentiate Primary key and Foreign key. | **2** |

**27** Write about preventive measures about health concerns due to overuse of Digital technology. **2**

**28** The Python code written below has syntactical errors. Rewrite the correct code and underline the corrections made. **2**

```
import pandas as pd
datal = {'A': [1, 2. 3], 'B': [4. 5, 6]}
data2 = {'A1: [7, 8. 9], 'B': [10. 11. 12]}
df1 = Pd.dataFrame(datal)
df2 = Pd.dataFrame(data2)
result = Pd.Concat([df1, df2])
```

**OR**

Complete the given Python code: to merge two DataFrames 'df1' and 'df2 based on the 'ID' column using Pandas.

```
import_____________ as pd
df1 = pd.DataFrame({'ID': [1, 2, 3, 4], 'Name': ['John', 'Jane','Mike', 'Emily']})
df2 = pd.DataFrame({'ID': [2, 4, 5, 6], 'Age': [25, 30, 22, 28]})
merged_df = pd.merge(_____, _____,_____ ='_____',_____ ='_____')
print(merged_df)
```

## SECTION C [4x3= 12]

**29** Simran often shares personal information and photos on various social networking sites. She is unaware of the potential risks associated with this behavior. **3**

(i) What is a digital footprint, and how does it relate to Simran's online activity?

(ii) What are some potential risks of sharing too much personal information online?

(iii) How can Simran protect her digital footprint?

**30** (A) Consider the following DataFrame df. **3**

| | Code | Name | Price | Qty | Discount |
|---|---|---|---|---|---|
| 0 | C1 | ABC | 5500 | 10 | 10 |
| 1 | C2 | XYZ | 4500 | 8 | 5 |
| 2 | C3 | PQR | 5200 | 12 | 8 |
| 3 | C4 | MNO | 3000 | 9 | 15 |
| 4 | C5 | LMN | 5500 | 11 | 12 |

Write the Python statements for the following:

(i) To display the column labels of the DataFrame.

(ii) To sort the index label of DataFrame df in descending order.

(iii) To obtain the avg price of the given set of prices from the DataFrame.

**OR**

(B) Given a series that stores the number of students in each class of a Happy Public School. Write python statement to find out the maximum and minimum number of students in any of the class. The given series has been created with the help of following statement:-

Strength = pd.Series( [47,39,52, 40, 42, 37, 50, 45, 47, 50, 43, 42])

**31** Consider a table courses with the following columns: course_id, course_name, instructor, start_date, and credits. **3**

I. Write an SQL statement to create a table named courses, with the following specifications:

course_Id: Integer, Primary Key

course_name: VARCHAR(100)

instructor: VARCHAR(100)

start_date: DATE

credits: INT

II. Write an SQL query to insert the following data into the courses table:

101, Introduction to Programming, Alice Smith, 2024-02-10, 4

**32** In a database OFFICE, we have one table given below: **3**

**Table : Garment**

| GCode | Description | Price | FCode | ReadyDate |
|---|---|---|---|---|
| 10023 | Pencil Skirt | 200 | F03 | 19-Dec-10 |
| 10001 | Formal Shirt | 150 | F01 | 12-Jan-10 |
| 10012 | Informal Shirt | 250 | F02 | 06-Jan-10 |
| 10024 | Baby Top | 300 | F03 | 07-Apr-09 |
| 10090 | Tulip Skirt | 350 | F02 | 31-Mar-09 |
| 10019 | Evening Gown | 400 | F03 | 06-Jun-10 |
| 10009 | Informal Pant | 250 | F02 | 20-0ct-10 |
| 10017 | Formal Pant | 300 | F01 | 09-Mar-09 |
| 10020 | Frock | 380 | F04 | 09-Sep-09 |
| 10089 | Slacks | 150 | F03 | 31-Oct-10 |

Table: Details

| Fcode | Discount | Location |
|---|---|---|
| F01 | 100 | Delhi |
| F02 | 200 | Mumbai |
| F03 | 300 | Chennai |
| F04 | 150 | Bangalore |

Consider the tables Garment and Details given above and answer the following questions :

(a) Display each Garment and corresponding discount on it.

(b) Display details of garments that will be ready in year 2010

(c) Increase price of all garments by 10%

***OR***

(B) Consider the following tables STOCK and DEALERS and answer the following query questions:

**Table : STOCK**

| ItemNo | Item | Dcode | Qty | UnitPrice | StockDate |
|---|---|---|---|---|---|
| 5005 | Ball Pen 0.5 | 102 | 100 | 16 | 31-Mar-10 |
| 5003 | Ball Pen 0.25 | 102 | 150 | 20 | 01-Jan-10 |
| 5002 | Gel Pen Premium | 101 | 125 | 14 | 14-Feb-10 |
| 5006 | Gel Pen Classic | 101 | 200 | 22 | 01-Jan-09 |
| 5001 | Eraser Small | 102 | 210 | 5 | 19-Mar-09 |
| 5004 | Eraser Big | 102 | 60 | 10 | 12-Dec-09 |
| 5009 | Sharpener Classic | 103 | 160 | 8 | 23-Jan-09 |

**Table : DEALERS**

| Dcode | Dname |
|---|---|
| 101 | Reliable Stationers |
| 103 | Classic Plastics |
| 102 | Clear Deals |

Give the output of the following SQL queries:

(a) SELECT COUNT(DISTINCT Dcode) FROM STOCK:

(b) SELECT Qty* UnitPrice FROM STOCK WHERE ItemNo=5006;

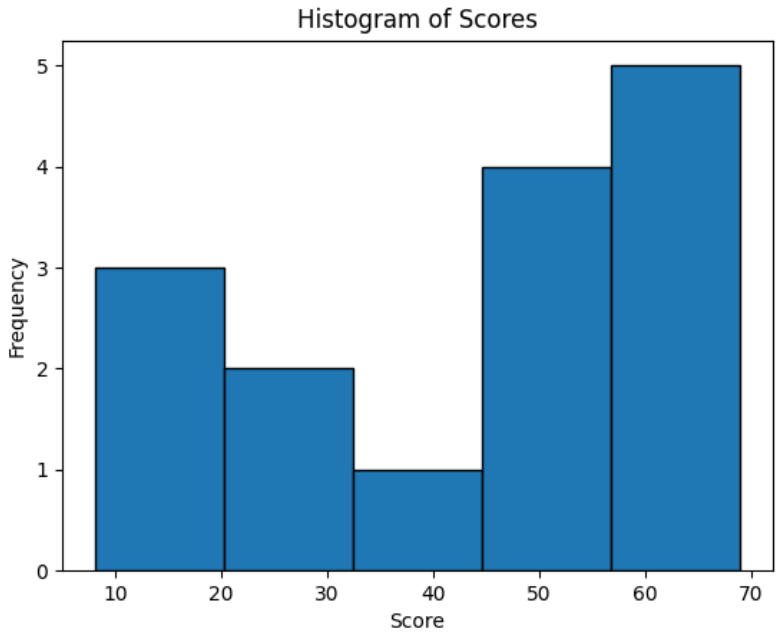
(c) SELECT Item. Dname FROM STOCK S. Dealers D WHERE S.Dcode=D.Dcode AND ItemNo = 5004;

(d) SELECT MIN (StockDate) FROM STOCK:

## SECTION D [2x4= 8]

**33** Write the python code to plot the given histogram with the following dataset: **4**

Score=[8,10,15,25,28,35,47,49,50,63,67,53,57,58,69]




```
import matplotlib._______ as plt #Statement-1
Score = [8,10,15,25,28,35,47,49,50,63,67,53,57,58,69]
plt.hist(_____, bins=5,edgecolor="black")#Statement-2
plt.title('Histogram of Scores')
plt. xlabel(_______)#Statement-3
plt.ylabel('Frequency')
plt._______#Statement-4
```

I.Write the suitable code for the import statement in the blank space in the line marked as Statement-1.

II. Refer to the graph shown above and fill in the blank in Statement-2 with suitable python code.

III. Fill in the blank in Statement-3 with the name of the function to set the label on the x-axis.

IV. Refer the graph shown above and fill the blank in Statement-4 with suitable Python code.

**34** Consider the table DOCTOR given below. Write commands in SQL for (i) to (iv). **4**

**TABLE DOCTOR**

| ID | Doc-Name | Department | Date of Join | Gender | Salary |
|---|---|---|---|---|---|
| 1 | Amit Kumar | Orthopaedics | 1A3-02-12 | M | 35000 |
| 2 | Anita Hans | Paediatrics | 19Q8-10-16 | F | 30000 |
| 3 | Sunita Maini | Gynaecology | 1991-08-23 | F | 40000 |
| 4 | Joe Thomas | Surgery' | 19Q4-10-20 | M | 55000 |
| 5 | Gurprcet Kaur | Paediatrics | 1999-11-24 | F | 52000 |
| 6 | Anandini Burman | Oncology | 1994-03-16 | F | 31000 |
| 7 | Siddharth Dang | Surgery' | 1995-09-08 | M | 47000 |
| 8 | Kama Mukherjee | Oncology | 2(XX)-06-27 | F | 54500 |

**(i)** Display the names and dates of joining of doctors of Oncology department.

**(ii)** Display the names and salaries of doctors in descending order of salaries.

**(iii)** Display the names and salaries of all the female's doctors who are getting salary above $ 50000.

**(iv)** Display names of each department along with total salary being given to doctors of that department.

**OR**

Write outputs of the following queries with respect to the **table Teachers**

| ID | Name | Department | HireDate | Category | Gender | Salary |
|---|---|---|---|---|---|---|
| 1 | Tarun Nanda | Hindi | 17-03-94 | TGT | M | 25000 |
| 2 | Sanjay Sharma | English | 12-02-90 | PRT | M | 20000 |
| 3 | Nikhil Arora | Arts | 16-05-80 | PGT | M | 30000 |
| 4 | James Kaur | Science | 16-10-89 | TGT | M | 25000 |
| 5 | Jaspreet Sehgal | Science | 01-08-90 | PGT | F | 22000 |
| 6 | Siddharth Kapoor | English | 10-02-80 | PRT | M | 21000 |
| 7 | Sonali Khanna | Arts | 02-09-94 | TGT | F | 27000 |
| 8 | Mukul Roy | Computer | 14-11-80 | TGT | M | 30000 |

(a) Select monthname(Hlredate) from Teachers where category="PRT";

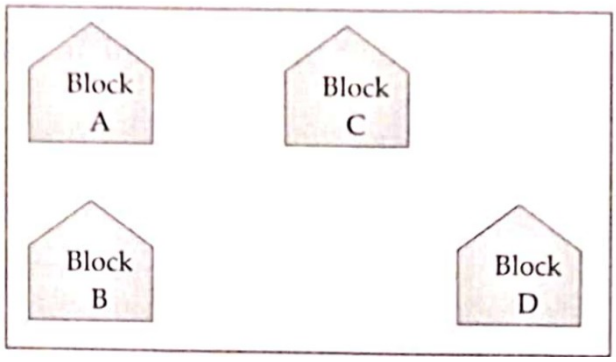
(b) Select Salary from Teachers where Department="Hindi":

(c) Select count(*) from Teachers where Gender="M";

(d) Select max(Salary) as max_salary From Teachers:

## SECTION E [3x5= 15]

**35** Knowledge supplement organisation has set up its new centre at Bangalore for its office and web based activities. It has -I blocks of buildings as shown in the diagram **5**




Centre to centre distances between various blocks:

| | |
|---|---|
| Block A to Block B | 50 m |
| Block B to Block C | 150 m |
| Block C to Block D | 25 m |
| Block A to Block D | 170 m |
| Block B to Block D | 125 m |
| Block A to Block C | 90 m |
| **Number of Computers** | |
| Block A | 25 |
| Block B | 50 |
| Block C | 125 |
| Block D | 10 |

**(i)** Suggest a cable layout of connections between the blocks.

**(ii)** Suggest the most suitable place (i.e. block) to house the server of this organisation with a suitable reason.

**(iii)** Suggest the placement of the following devices with justification.
(a) Repeater (b) Hub/Switch

**(iv)** The organisation is planning to link its front office situated in the city in a hilly region, where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed.

**(v)** What is the use of gateway in networking?

**36** Consider the DataFrame df shown below: **5**

| MovieID | Title | Year | Rating |
|---|---|---|---|
| 0 | AVATAR | 2009 | 7.8 |
| 1 | AVENGERS: ENDGAME | 2019 | 8.4 |
| 2 | TITANIC | 1997 | 7.9 |
| 3 | THE GODFATHER | 1972 | 9.2 |
| 4 | GLADIATOR | 2000 | 8.5 |

Write Python statements for the DataFrame df to:

(i) Print the first four rows of the DataFrame df.

(ii) Display the movie titles of all the movies.

(iii) Remove the column Rating.

(iv) Display the data of the Title column from indexes 0 to 2 (both included).

(v) Rename the column name Year to Release Year.

**37** Consider the table furniture: **5**

| itemid | itemname | price | quantity | manufacturer |
|---|---|---|---|---|
| 1 | Chair | 150 | 30 | ABC Furnishings |
| 2 | Table | 300 | 20 | XYZ Interiors |
| 3 | Sofa | 500 | 15 | ABC Furnishings |
| 4 | Desk | 200 | 25 | DEF Designs |

Write suitable SQL queries for the following:

**i)** To display the average price of all items from the furniture table.

**ii)** To display the first three characters of the item_name column from the furniture table.

**iii)** To display the data from the manufacturer column in the furniture table, after eliminating any leading and trailing spaces.

**iv)** To display the maximum value in the price column of the furniture table.

**v)** To determine the count of rows in the furniture table.

***OR***

Heena has created a table ' student' with the attributes id varchar(20), name varchar(50), city varchar(50), contactno varchar(ll) She wants to write the queries for the following. Help her write the queries for the same.

**i)** To extract the first four characters from the name

**ii)** To display the names in the lower case

**iii)** To display the characters from 4th position of column city

**iv)** Display the remainder of 100 divided by 9.

**v)** Remove all the expected leading and trailing spaces from a column Name of the table 'Student'.