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MARKING SCHEME - SAMPLE PAPER – 2
SUBJECT: INFORMATICS PRACTICES

SuperNova-LearnPython, a YouTube channel dedicated to helping students to learn Python and computer science concepts.
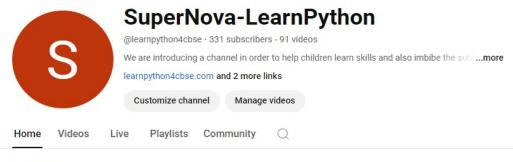
The channel covers various topics related to computer science, including *Python programming, data file handling, computer networking*, *SQL* and many more.

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! .

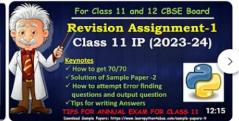**Please like, Subscribe and share the Channel**

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MARKING SCHEME - 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: Objective Questions (1 Mark Each)

1. **True or False:**
   - Statement: "The dtype attribute of a Pandas Series can be used to check the data type of the elements in the Series."
   - **Answer**: True
   - Explanation: The dtype attribute specifies the data type of the elements in a Pandas Series.

2. **The HAVING clause:**
   - **Answer**: (c) Acts like a WHERE clause but is used for groups rather than rows.
   - Explanation: HAVING is used for filtering group results after aggregation.

3. **Fastest transmission media:**

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- o **Answer**: (c) Optical fibre cable
- ▪ Explanation: Optical fiber provides the highest transmission speeds due to its light-based technology.

4. **Return type of COUNT() function in SQL:**
   - o **Answer**: (a) Integer
   - ▪ Explanation: The COUNT() function returns the number of rows, which is always an integer.

5. **Non-eWaste item:**
   - o **Answer: (d) Iron rods**
   - o **E**xplanation: eWaste consists of electronic items; iron rods are non-electronic.

6. **Correct statement to select a DataFrame column:**
   - o **Answer**: (b) df['column_name']
   - ▪ Explanation: In Pandas, square brackets are used to select a column.

7. **Plot known as "Whisker plot":**
   - o **Answer**: (d) Box plot
   - ▪ Explanation: A box plot visualizes data distribution and highlights outliers.

8. **SQL JOIN operation:**
   - o **Answer**: False
   - ▪ Explanation: JOIN combines rows based on conditions, not necessarily all rows.

9. **CSV file advantages:**
   - o **Answer**: (d) All the above
   - ▪ Explanation: CSV files are widely supported and efficient for storing tabular data.

10. **Category of software (free trial):**
    - o **Answer**: (d) Shareware software
    - ▪ Explanation: Shareware allows free use for a limited period.

11. **Primary key function in databases:**
    - o **Answer**: (a) Rows
    - ▪ Explanation: A primary key uniquely identifies rows in a table.

12. **SQL function to calculate average:**
    - o **Answer**: (b) AVG

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▪ Explanation: AVG computes the mean of a numeric column.

13. **Adding a new column to a DataFrame:**

   ○ **Answer**: (a) df['B'] = [1, 2, 3, 4]

   ▪ Explanation: Assign values to a new column using brackets.

14. **Online threats category:**

   ○ **Answer**: (a) Cyberbullying

   ▪ Explanation: Includes actions like threats or sharing private information.

15. **Incorrect statement regarding Pandas Series:**

   ○ **Answer**: (b) Their size can be increased later.

   ▪ Explanation: Series size is immutable after creation.

16. **Matching SQL operators:**

   ○ **Answer**: (a) P-3, Q-2, R-1, S-4

   ▪ Explanation: LIKE checks patterns, BETWEEN selects ranges, etc.

17. **JOIN type matching either table rows:**

   ○ **Answer**: (b) OUTER

   ▪ Explanation: An OUTER JOIN returns matches from both tables.

18. **Default Matplotlib plot color:**

   ○ **Answer**: (c) Blue

   ▪ Explanation: Matplotlib uses blue as its default color.

19. **Protocol for dynamic IP addressing:**

   ○ **Answer**: (b) DHCP

   ▪ Explanation: Dynamic Host Configuration Protocol (DHCP) assigns IPs dynamically.

20. **Assertion/Reason about Pandas Library:**

   ○ **Answer**: (a) Both Assertion (A) and Reason (R) are true, and R explains A.

   ▪ Explanation: Pandas is a Python library with features like Series and DataFrame.

21. **Assertion/Reason about SQL INSERT INTO command:**

   ○ **Answer**: (d) Assertion (A) is False, but Reason (R) is True.

   ▪ Explanation: INSERT INTO is a DML command; DDL creates/modifies structures.

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Section B: Short Answers (2 Marks Each)

Q22: Python code for the given operations on DataFrame:

```python
import pandas as pd
# DataFrame creation
data = {'Rollno': [11, 12, 13, 14, 15],
'Name': ['Aruna', 'Mohini', 'Kiya', 'Lakshami', 'Ravisha'],
'Age': [18, 14, 13, 16, 14],
'Marks': [68, 47, 78, 87, 60]}
df = pd.DataFrame(data)

# (a) Display students having marks more than 50
print(df[df['Marks'] > 50])

# (b) Display only Name and Marks columns
print(df[['Name', 'Marks']])
```

Alternatively:

Python Code to Create a Series:

```python
import pandas as pd
# Dictionary storing boys' count
data = {'Ninth': 10, 'Tenth': 20, 'Eleventh': 12, 'Twelfth': 16}
# Creating Pandas Series
boys_series = pd.Series(data)
print(boys_series)
```

Q23: Preventing identity theft:

• Avoid sharing personal details online.

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- Use strong passwords and change them regularly.
- Enable two-factor authentication for online accounts.

Q24: SQL COUNT Function Justification:

- COUNT(*) counts all rows (4 rows in employee table).
- COUNT(column) ignores NULL values (3 rows where commission is not NULL).

Q25: Web browsers:

- Examples: Chrome, Firefox, Safari, Edge.

- A web browser is a software that displays web pages.

26. Differentiate Primary Key and Foreign Key.

- **Primary Key**:
  - A primary key is a column (or a set of columns) in a database table that uniquely identifies each row in that table.
  - The values in a primary key column must be unique and not null.
  - There can be only one primary key in a table.
  - Example: StudentID in a Students table.
- **Foreign Key**:
  - A foreign key is a column (or a set of columns) in a table that establishes a link between the data in two tables.
  - The foreign key column in a child table points to the primary key of the parent table.
  - A foreign key ensures referential integrity by restricting actions that would destroy relationships between tables.
  - Example: CourseID in a Enrollments table, which references the primary key CourseID in a Courses table.

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

Overuse of digital technology can lead to various health issues such as eye strain, poor posture, sleep disruption, and mental health problems. Here are preventive measures:

1. **Take Regular Breaks**: Use the 20-20-20 rule: every 20 minutes, take a 20-second break and look at something 20 feet away to reduce eye strain.
2. **Ergonomics**: Maintain a proper ergonomic setup with a comfortable chair, screen at eye level, and feet flat on the ground.
3. **Blue Light Filters**: Use blue light filters or apps that reduce blue light exposure, especially at night, to prevent sleep disruption.
4. **Sleep Hygiene**: Limit screen time at least one hour before bedtime to avoid interference with melatonin production.
5. **Physical Activity**: Engage in regular physical exercise to counteract the effects of prolonged sitting.
6. **Mental Health**: Limit social media and technology usage to avoid digital addiction, which can lead to anxiety and depression.

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

```
import pandas as pd
data1 = {'A': [1, 2. 3], 'B': [4. 5, 6]}
data2 = {'A1: [7, 8. 9], 'B': [10. 11. 12]}
df1 = Pd.dataFrame(data1)
df2 = Pd.dataFrame(data2)
result = Pd.Concat([dfl, df2])
```

Corrected Code:

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```python
import pandas as pd
# Correcting the errors in dictionary and dataframe creation
data1 = {'A': [1, 2, 3], 'B': [4, 5, 6]}  # Correcting the period to commas
data2 = {'A': [7, 8, 9], 'B': [10, 11, 12]}  # Correcting the colon to equal sign and commas

# Correcting the DataFrame creation method (should be 'pd.DataFrame' not
'Pd.dataFrame')
df1 = pd.DataFrame(data1)
df2 = pd.DataFrame(data2)

# Correcting the method to concatenate DataFrames (should be 'pd.concat' not
'Pd.Concat')
result = pd.concat([df1, df2])
print(result)
```

For the second part of the question:

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

```python
import pandas 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]})

# Merge on 'ID' column
merged_df = pd.merge(df1, df2, how='inner', on='ID')

print(merged_df)
```

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Explanation:

- We use pd.merge to merge the two DataFrames (df1 and df2) based on the ID column.
- The how='inner' specifies an inner join, meaning only the rows with matching ID values in both DataFrames will be included in the result.

29. Simran's Online Activity and Digital Footprint

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

- A **digital footprint** is the trail of data left behind by a person's online activity. This includes the websites visited, social media posts, and other online interactions.
- **Simran's digital footprint** is created through the personal information and photos she shares on social media, which are recorded and can be accessed by others, even if she deletes them.

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

- **Identity Theft**: Personal information such as addresses, phone numbers, and birth dates can be used for identity theft.
- **Privacy Violations**: Sensitive information can be misused, and individuals might lose control over how it is shared.
- **Cyberbullying**: Excessive sharing of personal information may make one a target for cyberbullying.
- **Job Security**: Employers may review candidates' online profiles, and inappropriate content could impact hiring decisions.

(iii) How can Simran protect her digital footprint?

- **Limit Sharing**: Avoid oversharing personal details, especially sensitive information, on social media.

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- **Use Privacy Settings**: Adjust privacy settings on social platforms to control who can see her posts and personal details.
- **Think Before Posting**: Always think about the potential long-term consequences of sharing something online.
- **Use Strong Passwords**: Protect online accounts with strong passwords and enable two-factor authentication where possible.

Section C: Analytical Questions (3 Marks Each)

Q30: Performing operations on Pandas DataFrame:

```python
# Given DataFrame
data = {'Code': ['C1', 'C2', 'C3', 'C4', 'C5'],
'Name': ['ABC', 'XYZ', 'PQR', 'MNO', 'LMN'],
'Price': [5500, 4500, 5200, 3000, 5500],
'Qty': [10, 8, 12, 9, 11],
'Discount': [10, 5, 8, 15, 12]}
df = pd.DataFrame(data)

# (i) Display column labels
print(df.columns)

# (ii) Sort the index labels in descending order
print(df.sort_index(ascending=False))

# (iii) Calculate average price
avg_price = df['Price'].mean()
print("Average Price:", avg_price)
```

31. SQL Queries for Creating a Courses Table

I. **SQL Statement to Create the courses Table**:

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```
CREATE TABLE courses (
course_id INT PRIMARY KEY,
course_name VARCHAR(100),
instructor VARCHAR(100),
start_date DATE,
credits INT
);
```

II. **SQL Query to Insert Data into the courses Table**:

```
INSERT INTO courses (course_id, course_name, instructor, start_date, credits)
VALUES (101, 'Introduction to Programming', 'Alice Smith', '2024-02-10', 4);
```

32. SQL Queries for Garment and Details Tables

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

```
SELECT G.Description, D.Discount
FROM Garment G
JOIN Details D ON G.FCode = D.Fcode;
```

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

```
SELECT * FROM Garment
WHERE YEAR(ReadyDate) = 2010;
```

(c) Increase price of all garments by 10%.

```
UPDATE Garment
SET Price = Price * 1.10;
```

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33. Python Code to Plot a Histogram

i. Suitable code for the import statement:

import matplotlib.pyplot as plt

ii. Fill in the blank in Statement-2:

plt.hist(Score, bins=10) # Suitable Python code to plot the histogram

iii. Set the label on the x-axis:

plt.xlabel('Score') # Set the label for the x-axis

iv. Complete the Python code for plotting:

plt.title('Histogram of Scores') # Set the title of the graph

Section D: Case Studies (4 Marks Each)

Q34: SQL Queries for DOCTOR table:

```
-- (i) Display names and dates of joining of Oncology doctors
    SELECT Doc_Name, Date_of_Join
    FROM DOCTOR
    WHERE Department = 'Oncology';

-- (ii) Display names and salaries in descending order
    SELECT Doc_Name, Salary
    FROM DOCTOR
    ORDER BY Salary DESC;

-- (iii) Female doctors with salary above 50,000
```

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```
SELECT Doc_Name, Salary

FROM DOCTOR

WHERE Gender = 'F' AND Salary > 50000;


-- (iv) Total salary per department

SELECT Department, SUM(Salary) AS Total_Salary

FROM DOCTOR

GROUP BY Department;
```

Section E: Complex Problem Solving (5 Marks Each)

Q35: Networking Setup and Justification:

1. **Cable Layout**:
   - Connect as follows for minimum distance: Block A → Block C → Block B → Block D.
2. **Server Placement**:
   - Place in Block C (125 computers). This minimizes latency.
3. **Device Placement**:
   - **Repeater**: Between Block B and Block C (150 m distance).
   - **Hub/Switch**: One per block for efficient local network management.
4. **Connecting Front Office (Hilly Area)**:
   - Use satellite or cellular communication (cost-effective and reliable).
5. **Use of Gateway**:
   - Facilitates communication between dissimilar networks, e.g., LAN to WAN.

36. Python DataFrame Operations

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

print(df.head(4))

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

print(df['Title'])

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(iii) Remove the column Rating:

df.drop('Rating', axis=1, inplace=True)

(iv) Display the data of the Title column from indexes 0 to 2:

print(df['Title'].iloc[0:3])

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

df.rename(columns={'Year': 'Release Year'}, inplace=True)

37. SQL Queries for Furniture Table

i) **Display the average price of all items:**

SELECT AVG(price) AS avg_price FROM furniture;

ii) **Display the first three characters of the item_name:**

SELECT SUBSTRING(itemname, 1, 3) FROM furniture;

iii) **Remove any leading and trailing spaces from the manufacturer column:**

SELECT TRIM(manufacturer) FROM furniture;

iv) **Display the maximum value in the price column:**

SELECT MAX(price) AS max_price FROM furniture;

v) **Determine the count of rows in the furniture table:**

SELECT COUNT(*) FROM furniture;