BK BIRLA CENTRE FOR EDUCATION
SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL
MID TERM EXAMINATION 2024-25
INFORMATICS PRACTICES (065)
MARKING SCHEME

Class: XII   **Duration: 3 hrs.**
Date: **Max Marks: 70**
Name: ……………………………   **Exam No.**

General Instructions:

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1. This question paper contains four sections, Section A to D.
2. All questions are compulsory.
3. Section A has 15 questions carrying 01 mark each.
4. Section B has 08 Very Short Answer type questions carrying 02 marks each.
5. Section C has 07 Short Answer type questions carrying 03 marks each.
6. Section D has 06 questions carrying 04 marks each.
7. This question paper contains – Python programming language, MySQL and Computer Network.

SECTION-A

1. Missing data in Pandas object is represented through :   1
   (a) Null (b) None (c) Missing **(d) NaN**

2. To display the 3rd, 4th and 5th columns from the 6th to 9th rows of a dataframe DF, we   1
   can write _____ :
   (a) DF.loc[6:9, 3:5] (b) DF.loc[6:10,3:6] **(c) DF.iloc[6:10, 3:6]** (d) DF.iloc[6:9,3:5]

3. To iterate over horizontal subsets of a dataframe, _____ function may be used.   1
   (a) iterate() **(b) iterrows()** (c) itercols() (d) iteritems()

4. What functions does Pandas provide to handle missing data ?   1

Ans: Isnull( ), dropna(), fillna()

5. Consider the following program and answer any the questions: 1

   (a) import _____ as plt
   (b) plt._____ ('Vertical Bar Chart')

Ans: (a) matplotlib.pyplot
       (b) title() function

6. **Assertion:** The to_csv() function can be used to export a DataFrame to a CSV file.   1
   Reason: The to_csv() function is a built-in function in the pandas library that can be
   used to export a DataFrame to a CSV file. Is the assertion true ?
Ans: The assertion is true because the to_csv() function can be used to export a
       DataFrame to a CSV file.

7.   Predict the output of this SQL query: 1
     Select Mod(11,4) "Modulus";

Ans: Modules: 3

8.   Which SQL command is used to add a new attribute in a table ?   1

     (a) Modify (b) Add **(c) Alter** (d) All of these

9.   Write the output of the given SQL query: 1
     Select substr("Quadratically',5,6);

Ans: ratica

10. Which one of the following is not an aggregate function ?   1
     (Based on MySQL function)
     (a) ROUND() (b) SUM() (c) COUNT() (d) AVG()

11. By default, ORDER BY clause lists the results in _____ order.   1
     (a) Descending   (b) Any (c) None of these **(d) Ascending**

12. To create summary results, _____ clause is used.   1
     (a) SORT BY (b) SUMMARY BY **(c) GROUP BY** (d) ORDER BY

13. A ___ is a query that retrieves rows from more than one table or view.   1
     (a) Start   (b) End **(c) Join** (d) All of these

14. Which of the following topologies needs least cable length ?   1
     (a) Star (b) Tree **(c) Bus** (d) All of these

15. Switch is a ___.   1
     (a) Broadcast device   (b) Unicast Device (c) Multicast device (d) All of these.

SECTION-B

16. How is Series data structure different from a dataframe data structure ? Give example.   2

Ans: Series: one-dimensional array-like structure, can hold data of any type (integers, floats, strings, etc.), It is similar to a column in a table or a single list of data. DataFrame : a two-dimensional, tabular data structure with labeled axes, It is akin to a spreadsheet or SQL table, with rows and columns of data.

17. Write a python program to create a dataframe 'df1' of the given data: 2

	Mark1	Mark2	Mark3
Ajay	10	40	70
Sanjay	20	50	80
Shan	30	60	90

Ans:
```
import pandas as pd
data = {    'Mark1': [10, 20, 30],    'Mark2': [40, 50, 60],    'Mark3': [70, 80, 90]}
df1 = pd.DataFrame(data, index=['Ajay', 'Sanjay', 'Shan'])
print(df1)
```

18. What is pyplot ? Is it a python library ?   2

Ans: pyplot is not a standalone Python library but rather a module within the larger matplotlib library, which is widely used for creating static, animated, and interactive visualizations in Python.
pyplot is a submodule within the matplotlib library.
It is not a library.

19. Differentiate between **CHAR** and **VARCHAR** datatype. Give example.   2

Ans: **CHAR**
Used to store strings of fixed size,
Can range in size from 1 to 8000 bytes,
Uses a fixed amount of storage, based on the size of the column,
Better performance
VARCHAR
Used to store strings of variable length
Can range in size from 1 to 8000 bytes
Use varying amounts of storage space based on the size of the string stored.
Slightly poorer performance because length has to be accounted for.

20. Consider the following string : "Preoccupied". Write the SQL query to display: 2
(a) "occupied"   (b) "cup"

Ans: Select substr("Preoccupied",4) ; Select substr("Preoccupied",6,3);

21. Consider the following tables ACTIVITY and COACH and answer the following parts   2
of this question:
Table : ACTIVITY

Acode	ActivityName	Stadium	NumofParticipants	PrizeMoney	ScheduleDate
101	Football	National Stadium	22	5000.00	2024-09-15
102	Cricket	City Arena	22	7000.00	2024-09-20
103	Basketball	Central Court	10	3000.00	2024-09-18
104	Tennis	Eastside Court	2	4000.00	2024-09-22
105	Badminton	West Wing	4	2000.00	2024-09-25

Table : COACH

Pcode	Name	Acode
201	John Smith	101
202	Rajesh Kumar	102
203	Linda Brown	103
204	Amit Singh	104

Give the output of the following SQL queries:
(a) Select count(distinct NumofParticipants) from ACTIVITY;
(b) Select Name,ActivityName from ACTIVITY A, COACH C where
A.Acode=C.Acode and A.NumofParticipants=22;

Ans: (a) 22 (b) John Smith, Football - Rajesh Kumar, Cricket

22. Differentiate between LAN and WAN. (Based on Computer Network)   2

Ans:

Aspect	LAN (Local Area Network)	WAN (Wide Area Network)
Definition	A network covering a small geographic area, like a building.	A network covering a large geographic area, like cities or countries.
Coverage Area	Limited to a small area (e.g., office, home, school).	Spans a broad area (e.g., national or international).
Speed & Bandwidth	Typically high speed with high bandwidth (100 Mbps to 10 Gbps+).	Varies, usually lower than LAN (from a few Mbps to Gbps).
Ownership	Owned and managed by a single organization or individual.	Often involves multiple organizations or service providers.
Cost	Generally less expensive to set up and maintain.	Typically more costly due to extensive infrastructure and long-distance communication.
Technologies	Uses Ethernet, Wi-Fi, optical fiber, etc.	Utilizes leased lines, MPLS, satellite links, VPNs, etc.
Latency	Low latency due to short distances between devices.	Higher latency due to longer distances and varied transmission media.
Security	Managed locally with simpler security measures.	More complex security due to multiple networks and providers; includes encryption and VPNs.

23. You have a CSV file with data about students. The file has the following columns: 2
    Name, age, gender, grade
    Write a Python program to import the data from the CSV file into a DataFrame
    and display the complete DataFrame. [Note : separate used is '#']

Ans: import pandas as pd
      # Import data from the CSV file into a DataFramedf =
      pd.read_csv('students.csv',sep='#')
      print(df)

<center>SECTION-C</center>

24. Write a python program to create the given series (M1):   3
    [using either list or dictionary method]

	Marks
Term 1	45
Term 2	65
Term 3	24
Term 4	89

Ans: import pandas as pd
      M1=pd.Series([45,65,24,89], index=['Term 1","Term 2","Term 3","Term 4"])

25. **Consider the given dataframe 'df2'. Write a python program to solve (i), (ii) &**   3
    (iii)

```
         Math   Science   English
Student1   85       88        91
Student2   90       76        82
Student3   78       95        85
Student4   92       89        87
```

(i) Display minimum marks in math Subject
(ii) Display name, subject and maximum marks in subject Science.
(iii) Display the total marks scored in the English Subject.

Ans: (i) df2['Math'].min() (ii) n1=df2['Math'].idxmin() (iii) df2['English'].sum()

26. Following code is reading from **employee.csv** as show here and inteds to use column Empno's values as the index label. Why is the given code giving error ? Suggest solution.
import pandas as pd
edf=pd.read_csv("employee.csv", index_col="Empno.")
print(edf)
ValueError: Index Empno. invalid

3

```
File   Edit   View

Empno, Name, Designation, Salary
1001,John Doe,Manager,70000
1002,Jane Smith, Team Leader,65000
1003,Alice Johnson,Developer,60000
1004,Bob Brown,Analyst,55000
1005,Charlie Davis,Tester,50000
```

Ans: The above code is giving error because the column name is given as Empno. Whereas the column name in the csv file is Empno not Empno.
The correct code is:
edf=pd.read_csv("employee.csv", index_col="Empno")

27. Define SQL. Classify SQL commands with examples.

3

Ans: SQL is a standard programming language specifically designed for managing and manipulating relational databases. It allows users to create, read, update, and delete database records, among other tasks.
DDL, DML, DCL, TCL

28. Predict the output of the following queries:
(a) Select power(5,2);
(b) Select round(149.12,-2);
(c) Select upper(mid("Welcome to IT Lab",12));

3

Ans: (a) 25 (b) 100 (c) IT LAB

29. What is the difference between the order by and group by clause when used along with the select statement? Explain with an example.

3

Ans: The GROUP BY clause is used to group rows based on the values of one or more columns. It is often used in conjunction with aggregate functions such as SUM, COUNT, AVG, etc., to perform calculations on each group of rows.
The ORDER BY clause is used to sort the result set of a query based on one or more columns, either in ascending (ASC) or descending (DESC) order.
Examples:
SELECT PName, UPrice FROM PRODUCT ORDER BY UPrice DESC;
SELECT Manufacturer, COUNT(*) AS NumberOfProducts FROM PRODUCT GROUP BY Manufacturer;

30. How is equi-join different fron non-equi-join ? Give example. (Based on SQL JOINS)

An **equi-join** is a type of join in SQL where the joining condition uses equality between columns from different tables. It retrieves records with matching values in the specified columns.
Characteristics:
Uses the = operator to match rows between the joined tables.
Typically used to combine data from tables based on common key columns.
A **non-equi-join** is a type of join where the joining condition does not use equality but instead uses other comparison operators like <, >, <=, >=, or BETWEEN. It retrieves records based on conditions that do not rely on exact matches.
Characteristics:
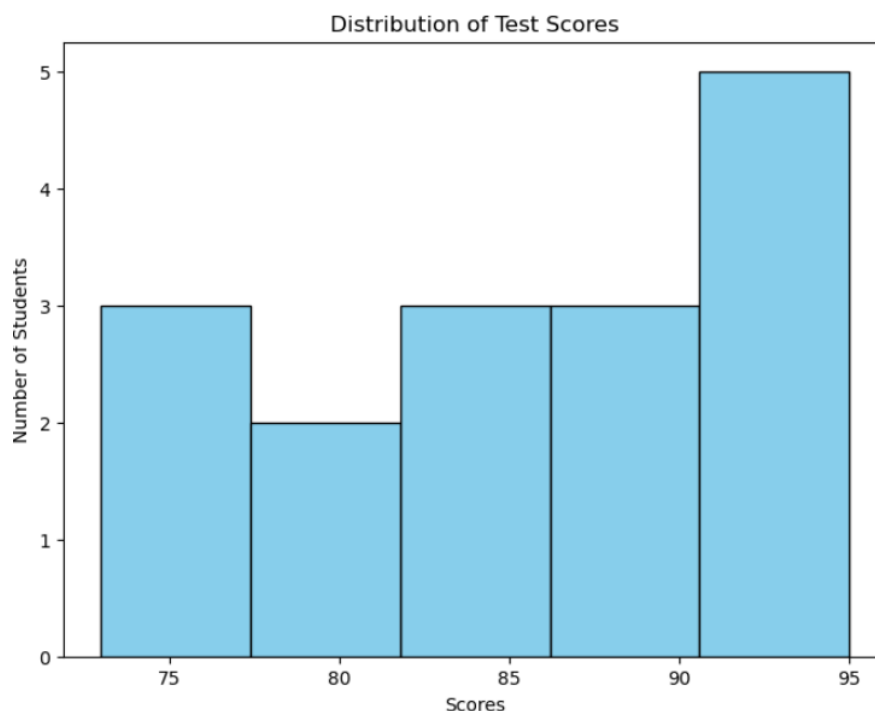Uses comparison operators other than = to match rows between tables.
Often used in scenarios where the relationship between data is not based on equality but on range or other comparisons.

SECTION-D

31. Write a python program to create a hitogram as given below: 4
Note: give edgecolor and color attributes

Distribution of Test Scores

Ans: import matplotlib.pyplot as plt
scores = [88, 92, 75, 85, 93, 89, 73, 78, 82, 91, 87, 95, 77, 84, 79, 94]
plt.figure(figsize=(8, 6))
plt.hist(scores, bins=5, color='skyblue', edgecolor='black')
plt.title('Distribution of Test Scores')
plt.xlabel('Scores')
plt.ylabel('Number of Students')
plt.show()

32.   Write a program that reads from a csv file (employee.csv stored in data folder pf C: 4
        drive having data as shown below: Name, Age, Department, Salary) in a dataframe.
        Then the program should add a new column 'Incentives' storing 10% of Salary for all
        the employee. Print the dataframe after adding the column.

File   Edit   View

```
Alice,24,HR,50000
Bob,30,IT,60000
Charlie,22,Finance,55000
David,35,Marketing,58000
Eve,29,IT,62000
```

Ans: import pandas as pd
data = {   'Name': ['Alice', 'Bob', 'Charlie', 'David', 'Eve'],
       'Age': [24, 30, 22, 35, 29],   'Department': ['HR', 'IT', 'Finance', 'Marketing', 'IT'],
       'Salary': [50000, 60000, 55000, 58000, 62000]}
df = pd.DataFrame(data)
df['Incentives'] = df['Salary'] * 0.10
df.to_csv('employee_records_with_incentives.csv', index=False)
print("CSV file 'employee_records_with_incentives.csv' created successfully.")

33.   Consider the given table named 'PRODUCT', showing details of products being sold   4
        in a grocery shop.

```
PCode     PName      UPrice    Manufacturer
101       Rice       50.00     Agro Farms
102       Wheat      45.50     Green Fields
103       Sugar      40.00     Sweet Company
104       Salt       15.00     Oceanic Industries
105       Tea        120.00    Brew Master
106       Coffee     150.00    Bean & Co.
```

        (a) Create the table 'PRODUCT' with appropriate data types and constraints.
        (b) Write SQL queries to add the above records. (At-least 2)
        (c) Identify the primary key

Ans: (a) Create table PRODUCT (PCode int(3) primary key, PName varchar(15) Not Null,
        UPrice decimal(6,2) not null, Manufacturer Varchar(30));
        (b) Insert into PRODUCT values(101,'Rice',50.00,'Agro Farms');
        (c) PCode is the primary key.

34. What is mysql function ? Name the different types. Explain each type with at-least two examples for **4**

Ans: It is a predefined set of SQL instructions that perform a specific task and return a single value. It is used to perform operations on data stored in the database, such as calculations, string manipulations, and date handling.
a) Single row b) Multiple row / Aggregate
Text/ String, Numeric, Date/Time
Examples: CONCAT(), LENGTH(), UPPER(), LOWER(), SUBSTRING()
Examples: ROUND(), ABS(), CEILING(), FLOOR(), MOD()
Examples: CURDATE(), NOW(), DATE_ADD(), DATE_SUB(), YEAR()
Examples: SUM(), COUNT(), AVG(), MAX(), MIN()

35. In a database Company, there are two tables given below: **4**
Table: SALES

SALESMANID	NAME	SALES	LOCATIONID
1	John Doe	15000.00	101
2	Jane Smith	22000.00	102
3	Robert Brown	18000.00	103
4	Emily Davis	24000.00	101
5	Michael Johnson	13000.00	104

Table: LOCATION

LOCATIONID	LOCATIONNAME
101	New York
102	Los Angeles
103	Chicago
104	Houston

Write SQL queries for the following:
(a) To display salesmanid, names of salesmen, LocationID with corresponding location names.
(b) To display names of salesmen, sales and corresponding location names who have achieved Sales more than 180000.
(c) Identify Primary key in the table SALES. Give reason for your choice.
(d) To display names of those salesmen who have 'SMITH' in ther names.

Ans: (a) Select S.Salesmanid, S.Name, S.Locationid, L.Locationname
From Sales S Inner Join Location L On S.Locationid = L.Locationid;
(b) Select S.Name, S.Sales, L.Locationname From Sales S Inner Join Location L On S.Locationid = L.Locationid Where S.Sales > 18000;
(c) SALESMANID is the primary key. It uniquely identifies each salesman and ensures that each entry in the SALES table can be distinguished from the others.
(d) Select Name From Sales Where Name Like '%Smith%';

36. "Bias methodologies" is planning to expand their network in India, starting with three cities in India to build infrastructure for research and development of the chemical products. The company has planned to set up their main office in Pondicherry - at three different locations and have named their offices as "Back office", "Research lab" and "Development unit". The company has one more research office namely "Corporate office" in Mumbai. A rough layout of the same is as follows.

4
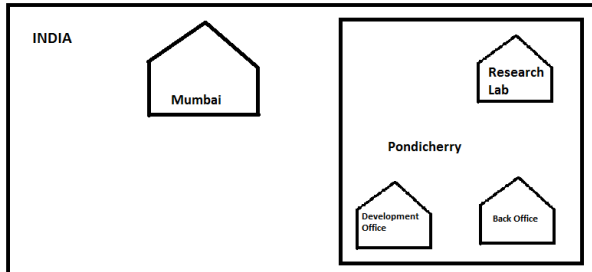
Approximate distance between these offices is as follows :

From	To	Distance
Research Lab	Back Office	110 metre
Research Lab	Development Unit	16 Km
Research Lab	Corporate Unit	1800 Km
Back office	Development Unit	13 Km

In continuation of the above, the company experts have planned to install the following number of computers in each of their offices:

Research Lab	158
Back office	79
Development Unit	90
Corporate Unit	51

(i) Suggest the kind of network required(out of LAN, MAN ,WAN) for connecting each of the following office units: Justify it.-> Research lab and Back office
-> Research lab and Development unit
(ii) Which one of the following devices will you suggest for connecting all the computers in each of their office units ? Justify it.
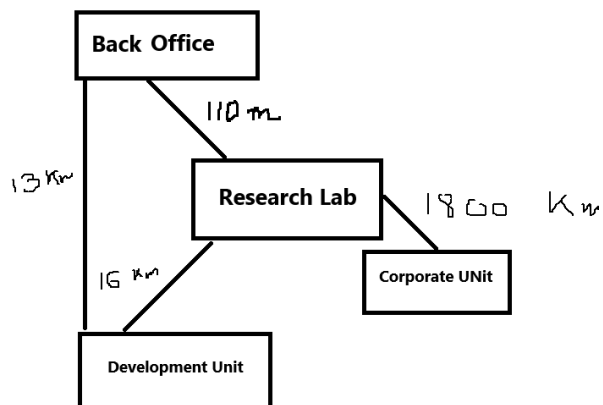-> Switch / hub
-> Modem
-> Telephone
(iii) Draw at-least two layouts and name the topology. Calculate the total distance or

length of cable Required.

Ans: (i) LAN, MAN   (ii) Switch / Hub
       (iii) Star topology or Tree topology

```
                    ┌─────────────────┐
                    │   Back  Office  │
                    └─────────────────┘
                      │  \   110 m
                13 Km │   \
                      │    ┌────────────────┐
                      │    │  Research Lab  │      1800  Km
                      │    └────────────────┘─────────────
                      │   /          \        ┌──────────────────┐
                16 Km │  /            \        │  Corporate UNit  │
                      │ /              \       └──────────────────┘
                    ┌────────────────────┐
                    │  Development Unit  │
                    └────────────────────┘
```

*** ALL THE BEST !!! ***