

**Class XII INFORMATICS PRACTICES (065)**  
**SAMPLE PAPER – 2 (THEORY) (2020-21)**  
**(Solved)**

Maximum Marks: 70

Time Allowed: 3 hrs

**General Instructions:**

1. This question paper contains two parts, A and B. Each part is compulsory.
2. Both Part A and Part B have choices.
3. Part A has 2 sections:
  - (a) Section I is short answer questions, to be answered in one word or one line.
  - (b) Section II has two case study questions. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of the 5 sub-parts.
4. Part B is Descriptive Paper. Part B has three sections:
  - (a) Section I is short answer questions of 2 marks each in which two questions have internal options.
  - (b) Section II is long answer questions of 3 marks each in which two questions have internal options.
  - (c) Section III is very long answer questions of 5 marks each in which one question has internal options.

**PART A – Section I**

Attempt any 15 questions from questions 1 to 21.

1. State whether True or False: (1)
- (i) Copying someone else's work or programs and claiming them as your own is an act of plagiarism.
  - (ii) Cyber bullying is an attempt to acquire sensitive information such as usernames, passwords and credit card details by sending emails or instant messaging.

Ans. (i) True (ii) False

2. Fill in the blanks: (1)
- T20 match analysis in Dubai is to be plotted. The command used to give title to y-axis as 'Total Score' of each team in a graph is .....

- (i) `plt.show()` (ii) `plt.plot("Total Score")`
- (iii) `plt.ylabel("Total Score")` (iv) `plt.title("Total Score")`

Ans. (iii) `plt.ylabel("Total Score")`

3. Write the output of the following SQL command. (1)
- ```
Select Round(67834.238, -3);
```

- (i) 68000 (ii) 67000
- (iii) 67834.000 (iv) 70000

Ans. (i) 68000

4. Which method is used to access horizontal subset of a dataframe? (1)
- (i) `iterrows()` (ii) `sort_values()`
  - (iii) `head()` (iv) `iteritems()`

Ans. (i) `iterrows()`

5. In Pandas, emp is a Series that stores names of the employees. (1)
- ```
emp=pd.Series(["Archana", "Tiya", "Manit", "Sanskaar"])
```
- Which command is used to assign the index as ("Emp1", "Emp2", "Emp3", "Emp4") explicitly?

- (i) `emp_index=('Emp1', 'Emp2', 'Emp3', 'Emp4')`
- (ii) `emp.index=('Emp1', 'Emp2', 'Emp3', 'Emp4')`
- (iii) `emp.index=['Emp1', 'Emp2', 'Emp3', 'Emp4']`
- (iv) `emp[index]=('Emp1', 'Emp2', 'Emp3', 'Emp4')`

Ans. (iii) `emp.index=['Emp1', 'Emp2', 'Emp3', 'Emp4']`

6. A histogram displays numerical data by grouping data into ..... of equal width. (1)

Ans. bins



7. This protocol is used to send email messages over the internet. (1)

**Ans.** SMTP—Simple Mail Transfer Protocol

8. .... refers to tabular data saved as plain text where data values are separated by commas. (1)

**Ans.** CSV (Comma Separated Values)

9. In ..... topology, each and every node has two neighbouring nodes. (1)

- (i) Bus (ii) Star
- (iii) Tree (iv) Ring

**Ans.** (iv) Ring

10. When you visit a website, a small text file called ..... is stored on your computer that keeps track of your visits and activities on a specific website. (1)

**Ans.** Cookie

11. A ..... is a set of one or more columns of a table that uniquely identifies a record in a database table but accepts only one null value. (1)

- (i) Primary Key (ii) Unique Key
- (iii) Foreign key (iv) Candidate key

**Ans.** (ii) Unique key

12. .... is a document that provides legally binding guidelines for the use and distribution of software. (1)

**Ans.** Software licensing

13. Write the output of the following code: (1)

```
import pandas as pd
Ser1=pd.Series(range(8),index=['A','B','C','D','E','F','G','H'])
print(Ser1)
```

**Ans.** A 0  
B 1  
C 2  
D 3  
E 4  
F 5  
G 6  
H 7

14. I can connect multiple computers and devices. (1)  
I can filter and forward data packets only to the intended computers.  
I am also called an intelligent hub.  
Who am I?

**Ans.** Switch

15. Write the output of the following code: (1)

```
import pandas as pd
Marks=pd.Series({'Rahul':80,'Aarush':98,'Shobhit':89,'Krish':90})
print(Marks[Marks>85])
```

**Ans.** Aarush 98  
Shobhit 89  
Krish 90  
dtype: int64

16. Which of the following is not a web browser? (1)  
Microsoft Edge, Windows, Internet Explorer, Google Chrome

**Ans.** Windows

17. Expand the following: (1)

- (i) PPP (ii) FTP

**Ans.** (i) PPP — Point to Point Protocol (ii) FTP — File Transfer Protocol

18. The ..... command is used to see the structure of the table. (1)

**Ans.** Desc or DESCRIBE Command

19. Write the output of the following code: (1)

```
import pandas as pd
a=pd.Series([78,45,89,98])
b=pd.Series([67,87,90])
student={"English":a,"Hindi":b}
df=pd.DataFrame(student)
print(df)
```

**Ans.**

	English	Hindi
0	78	67.0
1	45	87.0
2	89	90.0
3	98	NaN

20. As soon as a ..... enters your system, it immediately starts replicating itself with the sole goal of infecting as many networked systems and inadequately-protected computers as possible. (1)

**Ans.** Worm or Virus

21. Name the term used to describe traces of online activities that an individual performs on social media, online shopping, etc. (1)

**Ans.** Digital Footprints

## Section II

Both the case study-based questions (22 & 23) are compulsory. Attempt any four sub-parts from each question. Each sub-question carries 1 mark.

22. Assume a dataframe df that contains data about IT Quiz Contest with 'SC1','SC2','SC3','SC4','SC5' as indexes shown below. Give the output of any four questions from (i) to (v).

	School	Total_Students	Winner	Runner-up
SC1	APS	40	32	8
SC2	KPS	30	18	12
SC3	KKPS	20	18	2
SC4	MMPS	18	10	8
SC5	TPS	28	20	8

(i) >>>df.shape (1)

**Ans.** (5, 4)

(ii) >>>df1[2:4] (1)

**Ans.**

	School	Total_Students	Winner	Runner-up
SC3	KKPS	20	18	2
SC4	MMPS	18	10	8

(iii) >>>df.loc['SC2':'SC4','Winner'] (1)

**Ans.**

```
SC2    18
SC3    18
SC4    18
Name: Winner,
dtype: int64
```

(iv) >>>df.iloc[2:4] (1)

**Ans.**

	School	Total_Students	Winner	Runner-up
SC3	KKPS	20	18	2
SC4	MMPS	18	10	8

(v) >>>df.Total\_Students (1)

**Ans.**

```
40
30
20
18
28
Name: Total_Students,
dtype=int64
```





**Ans.**

```
import pandas as pd
d1= {"BookName":['Let us C', 'Artificial Intelligence', 'Database Management',
'Computer Architecture' ],"Class":[' BCA', 'B.Tech', 'BCA', 'BCA'],
"Price": [270,350,450,550]}
books=pd.DataFrame(d1,index=['B1', 'B2', 'B3', 'B4'])
print(books)
```

**25.** Differentiate between aggregate functions and single row functions. (2)  
OR

What is a Primary Key? List the criteria for selecting a Primary key for a table.

**Ans.** Aggregate functions take values of multiple rows and return a single value calculated after a certain condition. Aggregate functions are also called group functions or multiple row functions. Examples of aggregate functions are: MAX(), MIN(), SUM(), AVG(), COUNT().

Single row functions take single value to return a single value. They accept one or more arguments but return only single value. Examples of single row functions are: Mod(), Length(), Power(), etc.

OR

A primary key is a set of one or more columns which uniquely identifies a row in a table.

- (i) It must uniquely identify the row. (ii) It cannot have NULL values.

**26.** Write the output of the following SQL commands: (2)

- (i) `Select Mod(13,3);` (ii) `Select Power(5,3);`  
(iii) `Select Length("Data Science");` (iv) `Select Month('2020-03-12');`

**Ans.** (i) 1 (ii) 125  
(iii) 12 (iv) 3

**27.** What will be the output of the following program: (2)

```
import pandas as pd
a = pd.Series([10,20,30,40,50], index=['a', 'e', 'i', 'o', 'u'])
print(a * 5)
print(a < 30)
['i'] = 1000
print(s)
```

**Ans.**

```
a    50
e   100
i   150
o   200
u   250
dtype: int64
a    True
e    True
i    False
o    False
u    False
dtype: bool
a    10
e    20
i   1000
o    40
u    50
dtype: int64
```

**28.** Gunjan has entered the following SQL command on Table 'Result' that has TotalMarks as one of the columns: (2)

```
SELECT count(TotalMarks) from RESULT;
```

The output displayed is 43.



Then, Gunjan enters the following command:

```
Select count (*) from RESULT;
```

Now the output displayed is 50.

What could be the possible reason for different outputs? How many total records are there in the table Result?

**Ans.** count(TotalMarks) counts all the rows present in a column excluding Null values. The output is 43 as Null values are not counted, so there are 7 rows that have NULL values (50-7=43). Whereas count(\*) counts the total number of rows in a column including Null values; that is why the output returns 50. So there are total 50 records in the table Result.

**29.** Consider the following SQL string: "Operating System" (2)

Write the use of SUBSTR command to display:

- (i) "Opera" (ii) "stem"  
OR

Considering the same string "Operating System", write SQL commands to display:

- (i) the position of the substring 'era' in the string "Operating System"  
(ii) Replace the word Operating with "Computational"

**Ans.** (i) Select SUBSTR("Operating System",1,5);  
(ii) Select SUBSTR("Operating System",13);

Another way:

```
Select SUBSTR("Operating System",13,16);  
Select Mid("Operating System",13,16);
```

OR

- (i) Select INSTR(" Operating System ", "era");  
(ii) Select REPLACE("Operating System", "Operating", "Computational");

**30.** Lekisha wants to plot a bar chart for the students of 6th class of different sections who have opted for the given subjects. Complete the code to perform the following operations: (2)

- (i) To plot bar chart using the given data set of subjects and students.  
(ii) To provide xticks as subjects.

```
import matplotlib.pyplot as plt  
Students=[10,12,15,17,19]  
Subject=["French", "Sanskrit", "ICT", "Music", "Art"]  
_____ // Statement 1  
_____ // Statement 2  
plt.show()
```

**Ans.** (i) plt.bar(Students,Subject) (ii) plt.xticks(Subject)

**31.** Expand the following terms related to Computer Networks: (2)

- (i) MAC (ii) TCP/IP  
(iii) VoIP (iv) WAN

**Ans.** (i) Media Access Control (ii) Transmission Control Protocol/Internet Protocol  
(iii) Voice over Internet Protocol (iv) Wide Area Network

**32.** Deepanjali received an SMS from her bank querying a recent transaction that she made online and asking for the pin number. Answer the following questions as to what she should do on receiving this SMS. (2)

- (i) Should she SMS her pin number to the given contact number?  
(ii) Should she call the bank helpline number to recheck the validity of the SMS received?

**Ans.** (i) No, she should not respond to the message. If she responds by sending her pin number, then there is an absolute chance of her bank account being hacked, which can result in a huge financial loss to her.  
(ii) Yes, she should call the bank helpline number to check the validity of the SMS received as this is an act of cybercrime.



33. List some Network security components. (2)

- Ans. (i) Antivirus and anti-spyware.  
(ii) Firewall to block unauthorized access to your network.

### Section II

34. Consider the following dataframe df\_Student: (3)

AdmNo	Name	Class	Weight	Height
H1001	Tiana	IX B	50	163
H1006	Jiya	IX A	55	167
H1009	Shreyas	IX A	59	164

(i) Write the command to add a new column 'Age' having the following data: Age= ( 13,15,14)

Ans. `df_Student['Age']=[13,15,14]`

(ii) Write a command to permanently delete the record of student having AdmNo H1009.

Ans. `df_Student.drop('H1009', inplace=True)`

(iii) Write a command to display records in ascending order of age.

Ans. `print(df_Student.sort_values("Age"))`.

35. Explain the difference between a web hosting and web server with suitable examples. (3)

OR

Differentiate between Star topology and Bus topology.

Ans. **Web hosting:** Web hosting service is provided by companies to host web server applications through which websites are accessible to the internet users via world wide web. These companies are known as web hosts. The host may provide a control panel for managing web server to add new information to the website. Examples of web hosting companies are:

`webhostingsitesindia.co.in`, `godaddy.com`

**Web server:** A web server is a computer that runs websites. The basic objective of the web server is to store, process and deliver web pages to the users. This intercommunication is done using Hypertext Transfer Protocol (HTTP).

OR

Star topology	Bus topology
A central hub is required to connect all computers with each other.	A long cable known as backbone is used to connect all computers with each other.
The data is transmitted from the sender to the receiver by passing through a hub.	The data is transmitted through a long cable from the sender to the receiver.
No collision takes place through transmission of data.	Collision can take place as the data can be transmitted from both ends at the same time.
If the central hub fails, the entire network shuts down.	If there is a fault in a cable or terminator, no transmission takes place.

36. A dictionary 'toys' contains the following: (3)

`toys={'Name':['Talking Tom', 'Blocks','Number game', 'ludo'],  
      'Price':[ 400,250, 300,150]}`

Write statements for the following:

- (i) Create a Dataframe named "stock"  
(ii) Add a column called 'discount' with the following data:  
[ 30, 40, 15, 25]  
(iii) Delete column discount with all values.



Ans. (i) `stock= pd.DataFrame(toys)` (ii) `stock[“discount”]=[30,40,15,25]`  
 (iii) `stock.drop(“discount”, axis=1)`

37. A relation Product is given below:

(3)

P_No	Ptype	P_Manufacturer	Price	Qty
P1001	Pencil	Natraj	15	20
P1002	Ball Pen	Reynolds	10	50
P1003	Gel Pen	Flair	20	100
P1004	Sketch Pen	Doms	50	35
P1005	Paint Brush	Doms	30	15
P1006	Pencil	Natraj	15	30
P1007	Ball Pen	Reynolds	10	10
P1004	Sketch Pen	Doms	50	60
P1005	Paint Brush	Doms	30	85
P1006	Pencil	Natraj	15	45

Write SQL commands to:

(i) Display the Average price of each type of Product having quantity more than 30.

Ans. `Select avg(price) from Product group by Ptype having qty>30;`

(ii) Increase the price of the products manufactured by Doms by 2%.

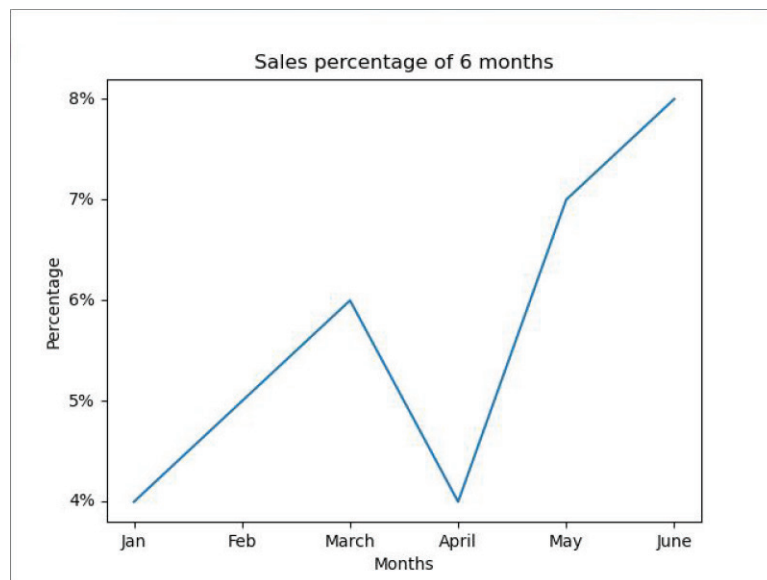
Ans. `Update Product set price=Price+(Price*2/100) where P_Manufacturer='Doms';`

(iii) Display the Maximum and Minimum price of all types of Products.

Ans. `Select Max(Price), Min(Price) from Product group by Ptype;`

### Section III

38. Write a code to plot the Sales Percentage of Bags for the last 6 months as shown in the figure given below: (5)

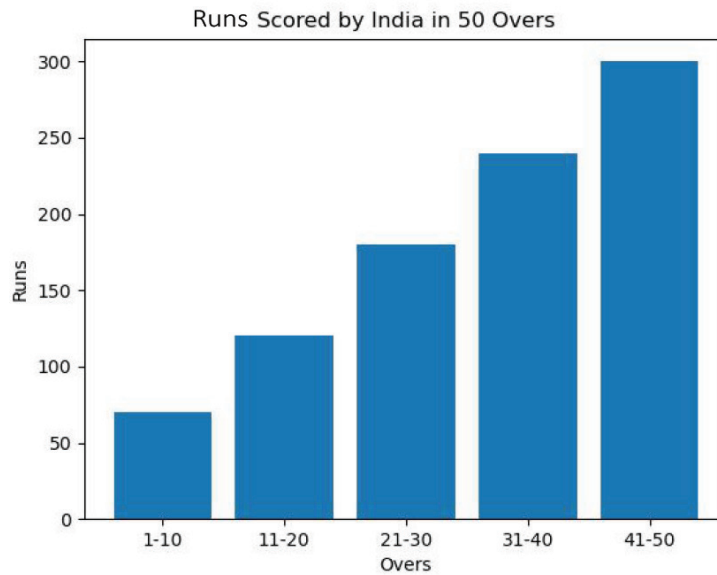


OR



Write a code to plot the histogram to display the total runs scored by India in a match as shown in the figure given below:

Runs=[70, 120,180,240, 300]



```
Ans. import matplotlib.pyplot as plt
month=["Jan", "Feb", "March", "April", "May", "June"]
sales=['4%', '5%', '6%', '4%', '7%', '8%']
plt.plot(month,sales)
plt.title("Sales percentage of 6 months")
plt.xlabel("Months")
plt.ylabel("Percentage")
plt.show()
```

OR

```
import matplotlib.pyplot as plt
overs=['1-10', '11-20', '21-30', '31-40', '41-50']
Runs=[70, 120,180,240, 300]
plt.bar(overs,Runs)
plt.title("Scored by India in 50 Overs")
plt.xlabel("Overs")
plt.ylabel("Runs")
plt.show()
```

39. Write a program in Python Pandas to create the following DataFrame TotalMarks from a Dictionary: (5)

RollNo	Name	TERM I	TERM II
1	Anshu	55	76
2	Prachi	82	88
3	Divyansh	95	98
4	Chetan	76	78
5	Sahil	68	65

Perform the following operations on the DataFrame TotalScore:

- Add both the Marks of a Student and assign to column "Total".
- Display the highest marks in both TERM I and TERM II of the DataFrame.
- Display the DataFrame.



OR

Write the SQL functions which will perform the following operations:

- (a) To display the string ("information technology") in Uppercase.
- (b) To remove spaces from the beginning and end of a string, " Informatics ".
- (c) To display the name of the day, e.g., Friday or Sunday from your date of birth, dob.
- (d) To display the starting position of your first name(fname) from your whole name(name).
- (e) To compute the remainder of division between two numbers, n1 and n2.

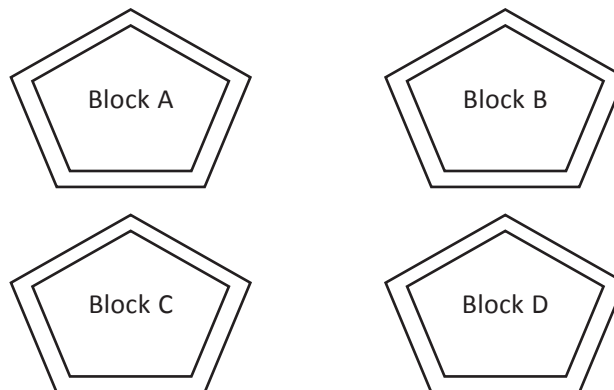
Ans. Creating a dataframe:

```
import pandas as pd
data={'RollNo':[1,2,3,4,5],
      'Name':["Anshu","Prachi","Divyansh","Chetan","Sahil"],
      'TERM I':[55,82,95,76,68], 'TERM II':[76,88,98,78,65] }
df_result=pd.DataFrame( data)
print(df_result)
(a) df_result['Total'] = df_result ['TERM I']+ df_result ['TERM II']
    print( df_result )
(b) print("Highest Marks are:" , max( df_result ['TERM I']),
        max( df_result ['TERM II']))
(c) print(df_result)
```

OR

- Ans. (a) `Select UPPER("information technology") ;`  
or  
`Select Ucase("information technology") ;`  
(b) `Select trim(" Informatics ") ;`  
(c) `Select dayname (date (dob)) ;`  
(d) `Select instr (name, fname) ;`  
(e) `Select mod (n1, n2) ;`

40. The Virtual Connects organization has set up its new centre at Noida for its office and web-based activities. It has 4 blocks of buildings as shown in the diagram below: (5)



Distance between the various blocks is as follows:

A to B	40 m
B to C	120 m
C to D	60 m
A to D	170 m
B to D	150 m
A to C	70 m

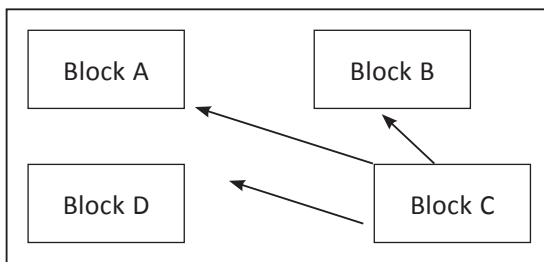
Number of computers:

Block A	25
Block B	50
Block C	125
Block D	10

- (i) Suggest the most suitable place (the Block) to install the server of this organization with a suitable reason.
- (ii) Suggest an ideal layout for connecting these blocks/centres for a wired connectivity.
- (iii) Which device will you suggest to be placed/installed in each of these blocks to efficiently connect all the computers within these blocks?
- (iv) Suggest the placement of a Repeater in the network with justification.
- (v) The organization is planning to link its office to an office in the hilly areas. Suggest a way to connect it economically. Justify your answer.

**Ans.** (i) The most suitable place to install the server is Block C as this place has maximum number of computers.

(ii)



(iii) Switch

- (iv) Repeater may be placed when the distance between 2 buildings is more than 70 metres, *i.e.*,
- Block B to Block C
  - Block A to Block D
  - Block B to Block D

(v) Radio waves, because these waves are easy to generate, can travel long distances and can penetrate mountains easily.

