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- Please check that this question paper contains 11 printed pages.
- Please check that this question paper contains 37 questions.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minutes time has been allotted to read the question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

INFORMATICS PRACTICES (065)

Time allowed: 3 hours

Maximum Marks: 70

General Instructions:

- All questions are compulsory.
- The examination paper contains five sections, from Section A to Section E.
- Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
- Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
- Section C consists of 4 questions (29 to 32). Each question carries 3 Marks.
- Section D consists of 2 questions (33 to 34). Each question carries 4 Marks.
- Section E consists of 3 questions (35 to 37). Each question carries 5 Marks.
- There is no overall choice. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
- All programming questions are to be answered using Python Language only.
- In case of MCQ, text of the correct answer should also be written.

Q No.	Section-A (21 x 1 = 21 Marks)	Marks
1	<p>State whether the following statement is True or False:</p> <p>Matplotlib can generate a wide range of plots, including line plots, bar plots, histograms and more</p>	1
2	<p>What will be the result of the following SQL query?</p> <p><code>SELECT POWER(2, MOD (17, 3)) ;</code></p> <p>(a) 8 (b) 1 (c) 0 (d) 4</p>	1

3	The software that is free for anyone, and its source code is available for access, modification, correction, and improvement is called (A) Proprietary software (B) Commercial software (C) Free and Open source software (D) Copyrighted software	1
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4	CSV stands for : a) Comma Separated Values b) Column Separated Values c) Comma Separated Variables d) Common Separated Variables	1
5	Purushottam is having an internet connection between his office and server room through an Ethernet cable (i.e. twisted pair). But the network speed is very poor and need to amplify/boost the signal. Which of the following device is required as a booster to amplify the signal? (A) Gateway (B) router (C) modem (D) repeater	1
6	Now() in MySQL returns (a) current date and time (b) Today's date (c) Name of active database (d) None of above	1
7	Ramanujan has written a Poem and wants to protect her literary work. Which type of Intellectual Property right will help her do that? (A) Patent (B) Copyright (C) Trademark (D) Both Copyright & Trademark	1
8	Size of DataFrame is_____ and values are_____ a) immutable, mutable b) mutable, mutable c) mutable, immutable d) immutable, immutable	1

9	<p>Which MySQL command helps to add a primary key constraint to any table that has already been created? (1)</p> <p>(a) UPDATE (b) INSERT INTO (c) ALTER TABLE (d) ORDER BY</p>	1
10	<p>Which of the following is an application of VoIP technology?</p> <p>(A) Email (B) Chat (C) Internet Telephony (D) Web Browsing</p>	1
11	<p>Which of the following SQL function is used to count the non-NULL values in a column named column_name?</p> <p>(A) COUNT(*) (B) COUNT(column_name) (C) SUM(column_name) (D) AVG(column_name)</p>	1
12	<p>We can create DataFrame from:</p> <p>a) Series b) Numpy arrays c) List of Dictionaries d) All of the above</p>	1
13	<p>In India, the primary law that deals e-commerce and cybercrime is _____.</p> <p>(A) Cybercrime Prevention Act, 2000 (B) Digital Security Act, 2000 (C) Information Technology Act, 2000 (D) E-Commerce Regulation Act, 2008</p>	1

14	<p>Which MySQL command helps sort values in a table</p> <p>(a) UPDATE (b) INSERT INTO (c) ALTER TABLE (d) ORDER BY</p>	1
15	<p>Which of the following Python commands selects the first 3 rows of a DataFrame dfrm, assuming that labelled index are consecutive integers starting from 0?</p> <p>(A) dfrm.loc[:2] (B) dfrm.loc[:3] (C) dfrm.loc[0:3] (D) dfrm.loc[1:3]</p>	1
16	<p>..... is a computer software capable of requesting, receiving & displaying information in the form of webpages.</p> <p>(A) Web Servers (B) Web Browsers (C) Web Designers (D) Web Camera</p>	1
17	<p>What is the use of the INSTR() function in SQL?</p> <p>(A) To replace characters in a string (B) To find the length of a string (C) To find the position of a substring in a string (D) To extract characters from a string</p>	1
18	<p>Given a Pandas series called HEAD, the command which will display the first 3 rows is .</p> <p>(A) print(HEAD.head(3)) (B) print(HEAD.Heads(3)) (C) print(HEAD.heads(3)) (D) print(head.HEAD(3))</p>	1

19	<p>Which of the following is NOT an aggregate function in SQL?</p> <p>(A) MIN() (B) SUM() (C) UPPER() (D) AVG()</p>	1
	<p>Q-20 and Q-21 are Assertion (A) and Reason (R) Type questions.</p> <p>Choose the correct option as:</p> <p>(A) Both A and R are True, and R correctly explains A. (B) Both A and R are True, but R does not correctly explain A. (C) A is True, but R is False. (D) A is False, but R is True.</p>	
20	<p>Assertion (A): DataFrame has both a row and column index.</p> <p>Reasoning (R): .loc() is a label based data selecting method to select a specific row(s) or column(s) which we want to select.</p>	1
21	<p>Assertion (A): The create table command is a DML (Data Manipulation Language) command.</p> <p>Reason (R): DDL commands are used to insert, update or delete the data stored in a database.</p>	1
Q No.	Section-B (7X2 = 14 Marks)	
22	<p>(A) What is a DataFrame in Pandas? Mention any one property of DataFrame.</p> <p style="text-align: center;">OR</p> <p>(B) List any two differences between Series and DataFrame in Pandas.</p>	2
23	What is e-waste? Name two hazardous substances commonly found in e-waste that pose risks to human health and the environment.	2

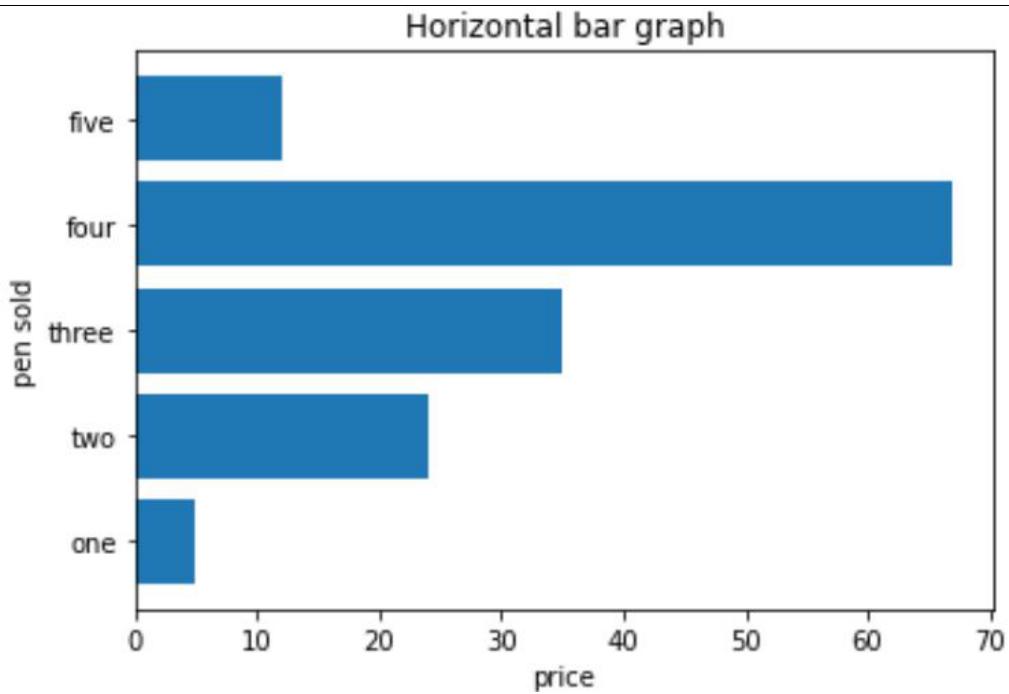
24	<p>Sanju wants to create a Pandas Series as shown below:</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td>Hindi</td><td>55</td></tr> <tr><td>English</td><td>65</td></tr> <tr><td>Science</td><td>35</td></tr> </table> <p>Help him in completing the code below to achieve the desired output.</p> <p>Note: marks_data is a dictionary.</p> <pre>import _____ as pd marks_data = _____ s = pd._____(marks_data) print(s)</pre>	Hindi	55	English	65	Science	35	2
Hindi	55							
English	65							
Science	35							

25	<p>(A) What are Difference between add-ons and plugins. OR (B) What is the web browser? Name any 2 commonly used web browser.</p>	2
26	<p>Write SQL queries to perform the following:</p> <ol style="list-style-type: none"> I. Display the Year for the date '2025-01-01'. II. Find and display the position of the substring "Science" in the string "Computer Science" 	2
27	<p>Define following (i) Cyber bullying (ii) Cyber stalking</p>	2
28	<p>(A) Write the output of the following code:</p> <pre>import pandas as pd S1=pd.Series([1,2,3,4]) S2=pd.Series([7,8,9,10]) S2.index=['a','b','c','d'] print((S1+S2).count())</pre> <p>OR</p> <p>(B) Write the output of the following code:</p> <pre>import pandas as pd vaccine_qty=pd.Series([10,16,1],index=["Typhoid","Tetanus","Hepatitis"]) cost=pd.Series([200,500,800],index=["Typhoid","Tetanus","Flu"]) print(vaccine_qty + cost)</pre>	2

Q No	Section-C (4X3 = 12 Marks)	Marks																							
29	<p>Seema has recently invented a new type of solar-powered water purification system and is concerned about the possibility of someone illegally copying and selling his invention without his permission.</p> <p>I. Explain Seema the terms Intellectual Property & Intellectual Property Rights (IPR).</p> <p>II. Under which specific category of IPR is Seema's invention covered?</p> <p>III. Describe the importance of IPR in safeguarding innovations.</p>	3																							
30	<p>(A) Write a Python program to create a Pandas Series as shown below using a ndarray, where the player names are the indices and the corresponding runs are the values in the series.</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td>Sachin</td><td>88</td></tr> <tr><td>Rahul</td><td>65</td></tr> <tr><td>Yuvraj</td><td>44</td></tr> <tr><td>Dhoni</td><td>27</td></tr> </table> <p style="text-align: center;">OR</p> <p>(B) Write a Python program to create the Pandas DataFrame displayed below using a list of dictionaries.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Course</th> <th>duration</th> </tr> </thead> <tbody> <tr><td>0</td><td>DECE</td><td>24</td></tr> <tr><td>1</td><td>DIPLOMA</td><td>12</td></tr> <tr><td>2</td><td>DEGREE</td><td>36</td></tr> <tr><td>3</td><td>CERTIFICATE</td><td>6</td></tr> </tbody> </table>	Sachin	88	Rahul	65	Yuvraj	44	Dhoni	27		Course	duration	0	DECE	24	1	DIPLOMA	12	2	DEGREE	36	3	CERTIFICATE	6	3
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31	<p>Write mysql statement for the following:</p> <p>(i) Create a database name TRAVELER</p> <p>(ii) Create table 'TRAVELS' with given details</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Column Name</th> <th>Data Types</th> <th>Constraint</th> </tr> </thead> <tbody> <tr><td>Tid</td><td>Integer</td><td>Primary Key</td></tr> <tr><td>Tname</td><td>Char(20)</td><td></td></tr> <tr><td>Loc1</td><td>Char(30)</td><td></td></tr> <tr><td>Journey_Date</td><td>Date</td><td></td></tr> <tr><td>Charges</td><td>Decimal(6,2)</td><td></td></tr> </tbody> </table>	Column Name	Data Types	Constraint	Tid	Integer	Primary Key	Tname	Char(20)		Loc1	Char(30)		Journey_Date	Date		Charges	Decimal(6,2)		2+1=3					
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32	<p>(A) Consider a Table VAHAN given below as:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>VNO</th><th>TYPE</th><th>COMPANY</th><th>YEAR</th><th>PRICE</th><th>QTY</th></tr> </thead> <tbody> <tr><td>V1</td><td>WAGONAR</td><td>MARUTI</td><td>2009</td><td>325000</td><td>35</td></tr> <tr><td>V2</td><td>JEEP</td><td>MAHINDRA</td><td>2005</td><td>1600000</td><td>10</td></tr> <tr><td>V3</td><td>MIRAGE</td><td>mitsubishi</td><td>2009</td><td>500000</td><td>15</td></tr> <tr><td>V4</td><td>RAV4</td><td>TOYOTA</td><td>2012</td><td>5500000</td><td>10</td></tr> <tr><td>V5</td><td>ALTO LXI</td><td>MARUTI</td><td>2012</td><td>310000</td><td>45</td></tr> <tr><td>V6</td><td>FTO</td><td>mitsubishi</td><td>2022</td><td>850000</td><td>8</td></tr> <tr><td>V7</td><td>LANCER</td><td>mitsubishi</td><td>2021</td><td>733000</td><td>9</td></tr> <tr><td>V8</td><td>GLANZA</td><td>TOYOTA</td><td>2022</td><td>659000</td><td>12</td></tr> </tbody> </table> <p>Write suitable SQL queries for the following:</p> <ul style="list-style-type: none"> i. Display year wise highest price ii. Display company name along with their year in decreasing order of their price. iii. Display sum of quantities available and number of cars available year wise. <p style="text-align: center;">OR</p> <p>Consider the below two relations FLIGHTS and BOOKING.</p> <p>Write appropriate SQL queries for the following:</p> <p>Table: flights</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>flightid</th><th>model</th><th>company</th></tr> </thead> <tbody> <tr><td>10</td><td>747</td><td>Boeing</td></tr> <tr><td>12</td><td>320</td><td>Airbus</td></tr> <tr><td>15</td><td>767</td><td>Boeing</td></tr> </tbody> </table> <p>Table: Booking</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ticketno</th><th>passenger</th><th>source</th><th>destination</th><th>quantity</th><th>price</th><th>Flightid</th></tr> </thead> <tbody> <tr><td>10001</td><td>ARUN</td><td>BAN</td><td>DEL</td><td>2</td><td>7000</td><td>10</td></tr> <tr><td>10002</td><td>ORAM</td><td>BAN</td><td>KOL</td><td>3</td><td>7500</td><td>12</td></tr> <tr><td>10003</td><td>SUMITA</td><td>DEL</td><td>MUM</td><td>1</td><td>6000</td><td>15</td></tr> <tr><td>10004</td><td>ALI</td><td>MUM</td><td>KOL</td><td>2</td><td>5600</td><td>12</td></tr> <tr><td>10005</td><td>GAGAN</td><td>MUM</td><td>DEL</td><td>4</td><td>5000</td><td>10</td></tr> </tbody> </table> <p>i. Display the company-wise total number of flights. ii. Display the name of all the passengers who are travelling to MUM in uppercase. iii. Display the Passenger names, source, destination along with their corresponding flight model.</p>	VNO	TYPE	COMPANY	YEAR	PRICE	QTY	V1	WAGONAR	MARUTI	2009	325000	35	V2	JEEP	MAHINDRA	2005	1600000	10	V3	MIRAGE	mitsubishi	2009	500000	15	V4	RAV4	TOYOTA	2012	5500000	10	V5	ALTO LXI	MARUTI	2012	310000	45	V6	FTO	mitsubishi	2022	850000	8	V7	LANCER	mitsubishi	2021	733000	9	V8	GLANZA	TOYOTA	2022	659000	12	flightid	model	company	10	747	Boeing	12	320	Airbus	15	767	Boeing	ticketno	passenger	source	destination	quantity	price	Flightid	10001	ARUN	BAN	DEL	2	7000	10	10002	ORAM	BAN	KOL	3	7500	12	10003	SUMITA	DEL	MUM	1	6000	15	10004	ALI	MUM	KOL	2	5600	12	10005	GAGAN	MUM	DEL	4	5000	10	3
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Q No.	Section-D (2X4 = 8 Marks)	Marks
33	<p>Mannat is studying in Class – XII in a school and during the study of “Plotting with Pyplot”, she develop a program to create a horizontal bar chart as per the data given. Help her to complete the program by supplying the missing statements :</p>	4



```

import ..... as plt           # Statement – 1
y = [ 'one', 'two', 'three', 'four', 'five' ]

# getting values against each value of y
x = [ 5, 24, 35, 67, 12 ]
.....( y, x )                # Statement – 2

# setting label of y-axis
.....("pen sold")           # Statement – 3

# setting label of x-axis
plt.xlabel( 'price' )
.....                         # Statement – 4
plt.show()

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

( II ) Write the Python statement in place of Statement – 2 to create the
above horizontal bar chart.

( III ) Fill in the blanks in Statement – 3 with the name of the function to set the
label on y – axis.

( IV ) Write the Python statement in statement-4 to set the title of the chart as
per the given figure.

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34

(A) Rahul is a Vehicle Designer works in an MNC. He is analysing the architecture of different vehicles and their prices. Help him to solve the queries based on the following table ‘vehicle’.

Relation : vehicle

v_no	Type	Company	Price	Quantity
AW125	Wagon	Maruti	250000	25
J0083	Jeep	Mahindra	4000000	15
S9090	SUV	Mitsubishi	2500000	18
M0892	Mini Van	Datsun	1500000	26
W9760	SUV	Maruti	2500000	18
R2409	Mini Van	Mahindra	350000	15

Write SQL commands to :

- (a.) Display the average price of each type of vehicle having total quantity more than 20.
- (b.) Count the number of type of vehicle manufactured by each company.
- (c.) Display the total price of all the types of vehicles.
- (d.) Display the unique ‘Type’ of vehicle.

OR

(B) Consider the following tables ‘CABHUB’ and ‘CUSTOMER’ and write the output of the following SQL queries :

Table : CABHUB

Vcode	VehicleName	Make	Color	Capacity	Charges
100	Innova	Toyota	White	7	15
102	SX4	Suzuki	Blue	4	14
104	C Class	Mercedes	Red	4	35
105	A-Star	Suzuki	White	3	14
108	Indigo	Tata	Silver	3	12

Table : CUSTOMER

CCode	CName	Vcode
1	Hemant Sahu	101
2	Raj Lal	108
3	Feroza Shah	105
4	Ketan Dhal	104

- (a.) SELECT VehicleName
FROM CABHUB
WHERE Color = ‘WHITE’ ;
- (b.) SELECT VehicleName, Make, capacity
FROM CABHUB
ORDER BY Capacity ;

4

	(c.) SELECT max(Charges), sum(Capacity) FROM CABHUB ; (d.) SELECT Cname, VehicleName FROM CUSTOMER, CABHUB WHERE CUSTOMER.Vcode = CABHUB.Vcode ;	
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Q No.	Section-E (3X5 = 15 Marks)	Marks
35	Oxford college, in Delhi is starting up the network between its different wings. There are four Buildings named as SENIOR, JUNIOR, ADMIN and HOSTEL as shown below:	5

JUNIOR

SENIOR

ADMIN

HOSTLE

The distances between these departments, as well as between Mumbai and Jaipur, are as follows:

JUNIOR to SENIOR	60 meters
JUNIOR to ADMIN	90 meters
JUNIOR to HOSTLE	120 meters
SENIOR to ADMIN	50 meters
SENIOR to HOSTLE	70 meters
ADMIN to HOSTLE	45 meters

The number of computers in each department/office is as follows:

Administration	120
Sales	40
Development	70
Support	25
Jaipur Office	50

As a network engineer, you have to propose solutions for various queries listed from I to V.

- I. Suggest the cable layout of connections between the buildings.
- II. Suggest the most suitable department in the Mumbai Office Setup, to install the server. Also, give a reason to justify your suggested location.
- III. Is there a requirement of a repeater in the given cable layout? Why/ Why not?
- IV. Suggest the placement of hub/switch with justification.
- V. Suggest the most appropriate type of network (LAN, MAN, WAN) to connect the Mumbai Head Office and Jaipur Regional Office.

36	<p>Consider the DataFrame df shown below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th><th>Name</th><th>Unit</th><th>Salary</th></tr> </thead> <tbody> <tr><td>0</td><td>Ramesh</td><td>HR</td><td>45000</td></tr> <tr><td>1</td><td>Neeraj</td><td>IT</td><td>33000</td></tr> <tr><td>2</td><td>Seema</td><td>Finance</td><td>87000</td></tr> <tr><td>3</td><td>Aditya</td><td>IT</td><td>33000</td></tr> <tr><td>4</td><td>Naresh</td><td>Marketing</td><td>25000</td></tr> </tbody> </table> <p>Write Python statements for the following tasks:</p> <ol style="list-style-type: none"> I. Print the last three rows of the DataFrame df. II. Add a new column named "Experience" with values [3, 8, 1, 6, 7]. III. Delete the column "Salary" from the DataFrame. IV. Rename the column "Unit" to "Dept". V. Display only the "Name" and "Salary" columns from the DataFrame. (Assume original dataframe) 		Name	Unit	Salary	0	Ramesh	HR	45000	1	Neeraj	IT	33000	2	Seema	Finance	87000	3	Aditya	IT	33000	4	Naresh	Marketing	25000	5
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2	Seema	Finance	87000																							
3	Aditya	IT	33000																							
4	Naresh	Marketing	25000																							
37	<p>(A) Write suitable SQL query for the following:</p> <ol style="list-style-type: none"> I. To extract the first four characters from the emp_code column in the Employee table. II. To display the total number of orders from Order_Id column in the Orders table. III. To display the year of the order dates from the order_date column in the Orders table. IV. To display the Address column from the Customers table after removing leading and trailing spaces V. To display the current date. <p style="text-align: center;">OR</p> <p>(B) Write suitable SQL query for the following:</p>	5																								

	<ul style="list-style-type: none">I. To display the total number of characters in the string DatabaseSystems.II. Find the position of the first occurrence of the letter 'a' in the Product_Name column of the Products table.III. Calculate the square of the Amount for each transaction in the Tran_Amount column of the Transactions table.IV. To display the average salary from the Salaries column in the Employees table.V. Display the total sum of the Salary from the Salary column in the Employees table.	
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