

Marking Scheme Strictly Confidential (For Internal and Restricted use only) SENIOR SECONDARY SUPPLEMENTARY EXAMINATION, 2025 SUB. NAME : INFORMATICS PRACTICES (SUB. CODE-065) (Q.P. CODE : 90/S)	
General Instructions: -	
	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
	“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc. may invite action under various rules of the Board and IPC.”
	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-XII, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.
	The Marking Scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
	Evaluators will mark (✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.

	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “ Extra Question ”.
	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
	A full scale of marks _____ (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
	The Examiners should acquaint themselves with the guidelines given in the “ Guidelines for Spot Evaluation ” before starting the actual evaluation.
	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

SPECIFIC INSTRUCTIONS FOR INFORMATICS PRACTICES ONLY

1	In Python, string content to be accepted within a pair of single quotes ' ' or within a pair of double quotes " ".
2	In MySQL, CHAR/VARCHAR/DATE type content to be accepted within a pair of single quotes ' ' or within a pair of double quotes " ".
3	In MySQL commands, lowercase/UPPERCASE both are correct.
4	In MySQL output questions, column headings to be ignored.
5	In MySQL output questions, alignment (left/right) of content to be ignored.
6	All answers/codes are suggestive, any other alternative correct answers to be accepted.

SECTION A		
1.	State whether the following statement is True or False : “Series data structure of Pandas can hold the value of integer data type only.”	1
Ans	False	
	<i>(1 Mark for correct answer)</i>	
2.	What will be the output of the following SQL command : SELECT MOD (20 , 6) ; (A) -2 (B) -4 (C) 2 (D) 4	1
Ans	(C) 2	
	<i>(1 Mark for correct answer)</i>	
3.	Webpages showing stock prices and weather update changes frequently, therefore such webpages are : (A) Fixed Webpages (B) Dynamic Webpages (C) Static Webpages (D) Dark Webpages	1
Ans	(B) Dynamic Webpages	
	<i>(1 Mark for correct answer)</i>	
4.	State True or False : Equi-join in SQL combines and displays data from two or more relations based on matching values in common attribute.	1
Ans	True	
	<i>(1 Mark for correct answer)</i>	

5.	The fraudulent act of obtaining the personal information of another person to commit online fraud, is called : (A) Copyright Infringement (B) Plagiarism (C) Cyberbullying (D) Identity Theft	1
Ans	(D) Identity Theft	
	(1 Mark for correct answer)	
6.	Which of the following functions is used to delete a row from a DataFrame ? (A) <code>drop()</code> (B) <code>delete()</code> (C) <code>remove_row()</code> (D) <code>pop_attribute()</code>	1
Ans	(A) <code>drop()</code>	
	(1 Mark for correct answer)	
7.	_____ is the type of indexing that allows us to filter a DataFrame by applying a condition. (Label Indexing / Boolean Indexing)	1
Ans	Boolean Indexing	
	(1 Mark for correct answer)	
8.	What will be the output of the following SQL query ? <code>SELECT MID ('INCREDIBLE INDIA' , 6 , 3) ;</code> (A) EDI (B) RED (C) DIB (D) CREDIB	1
Ans	(C) DIB	
	(1 Mark for correct answer)	
9.	Which of the following is the correct full form of CSV ? (A) Common Separated Values (B) Comma Separated Values (C) Colon Separated Values (D) Ctrl Separated Values	1
Ans	(B) Comma Separated Values	
	(1 Mark for correct answer)	
10.	Which of the following statements is true about Copyright ? (A) Copyright allows anyone to use, modify, and distribute a work without restrictions. (B) Copyright grants exclusive legal rights to the owner to copy, distribute, or create derivative of creative work. (C) Copyright applies only to written books. (D) Copyright does not cover digital content.	1

Ans	(B) Copyright grants exclusive legal rights to the owner to copy, distribute, or create derivative of creative work.	
	(1 Mark for correct answer)	
11.	What does the following SQL query do ? SELECT name, COUNT(*) FROM students GROUP BY name HAVING COUNT(*)>1; (A) Selects students with unique name. (B) Selects students who have the same name and counts them. (C) Displays the names and the number of occurrences for those names that appear more than once in the table. (D) Orders students by name and counts them.	1
Ans	(C) Displays the names and the number of occurrences for those names that appear more than once in the table.	
	(1 Mark for correct answer)	
12.	I help to regenerate and amplify the signals to ensure reliable communication over long distances. Who am I ? (A) Modem (B) Router (C) Repeater (D) Switch	1
Ans	(C) Repeater	
	(1 Mark for correct answer)	
13.	NumPy stands for _____ Python. (A) Numerous (B) Neural (C) Numerical (D) Numron	1
Ans	(C) Numerical	
	(1 Mark for correct answer)	
14.	Which of the following is a potential hazard associated with e-waste disposal ? (A) Phishing (B) Spread of computer virus (C) Decrease in computer performance (D) Pollution	1
Ans	(D) Pollution	
	(1 Mark for correct answer)	
15.	To create a Pandas series from an ndarray array1 , which of the following statements can be used ?	1

	(Note : Assume pd as alias for pandas) (A) <code>pd.array (array1)</code> (B) <code>nd.series (array1)</code> (C) <code>pd.Series (array1)</code> (D) <code>array1.toSeries()</code>	
Ans	(C) <code>pd.Series (array1)</code>	
	<i>(1 Mark for correct answer)</i>	
16.	The ALTER command in SQL can be used to : (A) Alter data within a table (B) Delete data from a table (C) Modify the structure of a table (D) Create a new table	1
Ans	(C) Modify the structure of a table	
	<i>(1 Mark for correct answer)</i>	
17.	Which method is used to store data from a Pandas DataFrame dF into a CSV file ? (A) <code>dF.store_csv()</code> (B) <code>dF.csv_store()</code> (C) <code>dF.to_csv()</code> (D) <code>dF.set_csv()</code>	1
Ans	(C) <code>dF.to_csv()</code>	
	<i>(1 Mark for correct answer)</i>	
18.	How can we add a new column named 'name' to a DataFrame dF ? (Note : Assume the values for the column are stored in a list named data) (A) <code>dF.add_column(name,data)</code> (B) <code>dF[name] = data</code> (C) <code>dF.set_column(name,data)</code> (D) <code>dF.add(name,data)</code>	1
Ans	(B) <code>dF[name] = data</code>	
	<i>(1 Mark for correct answer)</i>	
19.	Name the device that converts data from digital to analog and vice versa in a network : (A) Router (B) Repeater (C) Modem (D) Gateway	1
Ans	(C) Modem	
	<i>(1 Mark for correct answer)</i>	
	Questions 20 and 21 are Assertion (A) and Reason (R) based questions. Mark the correct choice as :	

	(A) Both Assertion (A) are true and Reason (R) is the correct explanation for Assertion (A). (B) Both Assertion (A) and Reason (R) are true and Reason (R) is <i>not</i> the correct explanation for 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 high level data manipulation tool used for analyzing data. Reason (R) : It is very easy to import and export data using the Pandas library which has a very rich set of functions.	1																
Ans	(A) Both Assertion (A) and Reason (R) are True and Reason (R) is the correct explanation for Assertion (A).																	
	(1 Mark for correct answer)																	
21.	Assertion (A) : There can be multiple primary keys in a relation. Reason (R) : There can be multiple candidate keys in a relation but only one of these is chosen as primary key.	1																
Ans	(D) Assertion (A) is False, but Reason (R) is True.																	
	(1 Mark for correct answer)																	
	SECTION B																	
22.	(a) What is DataFrame in Pandas ? Explain with the help of an example.	2																
Ans	A DataFrame is a two-dimensional labelled data structure in Pandas in which data is organized into rows and columns. For example student's data can be organized in a DataFrame as follows : <table> <tr> <th></th> <th>Name</th> <th>Subject</th> <th>Marks</th> </tr> <tr> <td>1 .</td> <td>Rozy</td> <td>IP</td> <td>90</td> </tr> <tr> <td>2 .</td> <td>Rekha</td> <td>HSC</td> <td>92</td> </tr> <tr> <td>3 .</td> <td>Arav</td> <td>IP</td> <td>95</td> </tr> </table>		Name	Subject	Marks	1 .	Rozy	IP	90	2 .	Rekha	HSC	92	3 .	Arav	IP	95	
	Name	Subject	Marks															
1 .	Rozy	IP	90															
2 .	Rekha	HSC	92															
3 .	Arav	IP	95															
	(1 mark for the correct definition)																	
	(1 mark for explanation with example)																	
	OR																	
	(b) What is data visualization ? Also mention its any one main purpose.																	
Ans	Data Visualization is the graphical representation of data and information using charts, graphs, maps, and other visual formats. The purpose of data visualization is to help people understand and interpret data easily by presenting it in a visual form.																	
	(1 mark for definition)																	
	(1 mark for correct purpose)																	
23.	Mention any two health concerns associated with excessive usage of technology.	2																

Ans	(i) Eye strain (ii) Sleep disorder (iii) Back/neck pain (iv) Mental health issues like anxiety, depression (v) Reduced attention span	
	(1 mark each for writing any 2 correct health concerns)	
24.	Write SQL Queries to perform the following task : (i) Extract the leftmost 5 characters after removing the leading and trailing spaces from "DESIGN THINKING" (ii) Display the day name of the week when the National Space Day was celebrated first i.e., '23-08-2023'.	2
Ans	(i) SELECT LEFT(TRIM("DESIGN THINKING"), 5) ; (ii) SELECT DAYNAME('2023-08-23') ;	
	(1 mark for writing correct answer of Part i) (1 mark for writing correct answer of Part ii)	
25.	(a)What is a Web Server ?	2
Ans	A web server is a computer system that stores, processes, and delivers web content to users over the internet. Examples: Nginx, Apache Tomcat, IIS etc.	
	(2 marks for writing the correct definition)	
	OR (b) Write any one advantage and one disadvantage of bus topology.	
Ans	Advantage and disadvantage of Bus Topology : Advantage : 1. It is cost effective as it uses less cable length. 2. It is easy to expand as new devices can be added to the network by connecting them to the backbone cable. 3. The network can function even if one device fails (as long as the main cable is intact) 4. Broadcasting is Easy in Bus topology since all devices are on the same cable. Disadvantage : 1. High network traffic can lead to collisions, causing delays. 2. All devices share the same cable, so only one can transmit at a time. 3. If the main cable fails, the entire network goes down. 4. Performance degrades as more devices are added.	
	(1 mark for writing any one correct advantage) (1 mark for writing any one correct disadvantage)	
26.	What are aggregate functions in SQL ? Name any two aggregate functions.	2

Ans	Aggregate functions perform operations on a set of values and return a single value. Example : SUM() , AVG() , MAX() , MIN() , COUNT()	
	(1 mark for correct definition) (½ mark each for any two correct examples)	
27.	What is a digital footprint ? Also, provide two examples of how it's created.	2
Ans	A digital footprint is the collection of data and information that you leave behind whenever you use digital devices or access the internet. Examples of how a digital footprint is created : (1) Social media activity (2) Online shopping (3) Browsing History (4) E-Mail and Messaging	
	(1 mark for writing the correct definition) (½ mark each for writing any two correct examples)	
28.	(a) Arjun is trying to load data from a csv file, where values are separated by commas, into a DataFrame using Pandas, but his code has errors. Identify the mistakes, rewrite the correct code, and underline the corrections made. import Pandas as pd df = pd.load_csv('data.csv' , sep="-") print(data_frame)	2
Ans	import <u>pandas</u> as pd df = pd. <u>read_csv</u> ('data.csv' , <u>sep</u> =",") print(<u>df</u>)	
	(½ mark for writing each correction and underlining) Note: 1 Mark to be awarded for only identification of mistakes	
	OR (b) Complete the given Python code to get the required output as (ignore the dtype attribute) : Output : Dog Mammal Cat Mammal Goldfish Fish	

	Code : <pre> import _____ as pd data = ['Mammal', 'Mammal', 'Fish'] indx = ['Dog', '_____', 'Goldfish'] s = pd.Series (_____, index=indx) print(_____) </pre>																
Ans	<pre> import <u>pandas</u> as pd data = ['Mammal', 'Mammal', 'Fish'] indx = ['Dog', '<u>Cat</u>', 'Goldfish'] s = pd.Series (<u>data</u>, index=indx) print(<u>s</u>) </pre>																
	<i>(½ mark each for filling each blank)</i>																
	SECTION - C																
29.	Akshay is writing a research paper and directly copies several paragraphs from an online article without crediting the original author. (i) Identify the act of misconduct. (ii) Suggest one way to Akshay to avoid such misconduct. (iii) What is the significance of IPR ?	3															
Ans	(i) Akshay is committing plagiarism. (ii) Akshay can avoid plagiarism by properly citing (giving references) sources when using content of others. (iii) IPR are important for protecting creativity and innovating. They provide legal protection to authors, inventors and creators, allowing them to benefit from their work.																
	<i>(1 mark for writing each correct answer)</i>																
30.	(a) Write a Python Program to create a DataFrame using a list of dictionaries with the following data : <table border="1"> <thead> <tr> <th></th><th>Student</th><th>Marks</th></tr> </thead> <tbody> <tr> <td>0</td><td>Aarav</td><td>85</td></tr> <tr> <td>1</td><td>Aisha</td><td>90</td></tr> <tr> <td>2</td><td>Vivaan</td><td>78</td></tr> <tr> <td>3</td><td>Meera</td><td>92</td></tr> </tbody> </table>		Student	Marks	0	Aarav	85	1	Aisha	90	2	Vivaan	78	3	Meera	92	3
	Student	Marks															
0	Aarav	85															
1	Aisha	90															
2	Vivaan	78															
3	Meera	92															

Ans	<pre>import pandas as pd data = [{'Student': 'Aarav', 'Marks': 85}, {'Student': 'Aisha', 'Marks': 90}, {'Student': 'Visaan', 'Marks': 78}, {'Student': 'Meera', 'Marks': 92}] df = pd.DataFrame(data)</pre>																
	<i>(1 mark for correct import statement)</i> <i>(1 mark for correct list of dictionary)</i> <i>(1 mark for creating the DataFrame correctly)</i>																
	OR (b) Write a Python program to create a Pandas Series from a scalar value. The Series should have indexes as 'X1', 'X2', 'X3', 'X4', 'X5' with each value in the Series set to 100.																
Ans	<pre>import pandas as pd val = 100 indx = ['X1', 'X2', 'X3', 'X4', 'X5'] series = pd.Series(val, index=indx)</pre>																
	<i>(1 mark for correct import statement)</i> <i>(1 mark for correct scalar value and index)</i> <i>(1 mark for series statement)</i>																
31.	(a) Write the SQL statement to create a table Customer with the following specifications : Table : Customer <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Column Name</th><th>Data Type</th><th>Key</th></tr> </thead> <tbody> <tr> <td>CID</td><td>Numeric</td><td>Primary Key</td></tr> <tr> <td>Name</td><td>Varchar(50)</td><td></td></tr> <tr> <td>Dob</td><td>Date</td><td></td></tr> <tr> <td>Phone</td><td>Varchar(15)</td><td></td></tr> </tbody> </table>	Column Name	Data Type	Key	CID	Numeric	Primary Key	Name	Varchar(50)		Dob	Date		Phone	Varchar(15)		2
Column Name	Data Type	Key															
CID	Numeric	Primary Key															
Name	Varchar(50)																
Dob	Date																
Phone	Varchar(15)																
Ans	<pre>CREATE TABLE Customer (CID Numeric PRIMARY KEY, Name Varchar(50), Dob Date, Phone Varchar(15));</pre>																

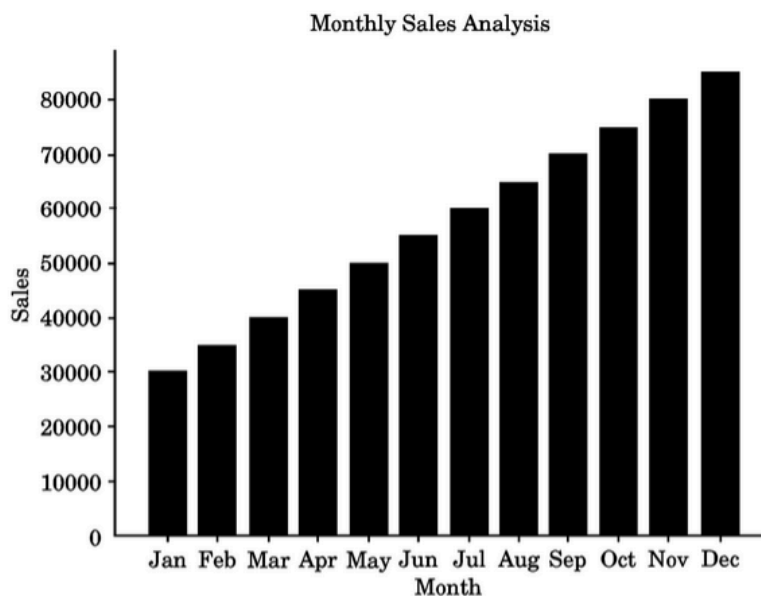
	(1 mark for CREATE TABLE Customer) (½ mark for CID Numeric PRIMARY KEY) (½ mark each for defining attributes Name, Dob and Phone correctly)																																																	
	(b) Write the SQL query to display the total number of records in the table Customer.	1																																																
Ans	SELECT COUNT(*) FROM Customer;																																																	
	(½ mark for SELECT part) (½ mark for FROM part)																																																	
32.	(a) Given the following tables : Table : EMPLOYEES<table><tr><th>EMP_ID</th><th>EMP_NAME</th><th>DEPARTMENT</th><th>JOIN_DATE</th></tr><tr><td>1</td><td>Ramesh</td><td>HR</td><td>2022-01-10</td></tr><tr><td>2</td><td>Sita</td><td>Finance</td><td>2021-03-15</td></tr><tr><td>3</td><td>Manoj</td><td>IT</td><td>2022-07-20</td></tr><tr><td>4</td><td>Priya</td><td>HR</td><td>2021-11-30</td></tr><tr><td>5</td><td>Kumar</td><td>IT</td><td>2022-05-10</td></tr></table> Table : PROJECTS<table><tr><th>PROJECT_ID</th><th>EMP_ID</th><th>PROJECT_NAME</th><th>HOURS</th></tr><tr><td>1</td><td>1</td><td>Recruitment</td><td>120</td></tr><tr><td>2</td><td>2</td><td>Budgeting</td><td>150</td></tr><tr><td>3</td><td>3</td><td>Development</td><td>180</td></tr><tr><td>4</td><td>1</td><td>Budgeting</td><td>100</td></tr><tr><td>5</td><td>5</td><td>Recruitment</td><td>200</td></tr></table>	EMP_ID	EMP_NAME	DEPARTMENT	JOIN_DATE	1	Ramesh	HR	2022-01-10	2	Sita	Finance	2021-03-15	3	Manoj	IT	2022-07-20	4	Priya	HR	2021-11-30	5	Kumar	IT	2022-05-10	PROJECT_ID	EMP_ID	PROJECT_NAME	HOURS	1	1	Recruitment	120	2	2	Budgeting	150	3	3	Development	180	4	1	Budgeting	100	5	5	Recruitment	200	3
EMP_ID	EMP_NAME	DEPARTMENT	JOIN_DATE																																															
1	Ramesh	HR	2022-01-10																																															
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1	1	Recruitment	120																																															
2	2	Budgeting	150																																															
3	3	Development	180																																															
4	1	Budgeting	100																																															
5	5	Recruitment	200																																															
	(i) For each department, show the department names and the total count of employees working there.																																																	
Ans	SELECT DEPARTMENT, COUNT (*) FROM EMPLOYEES GROUP BY DEPARTMENT;																																																	
	(½ mark for SELECT part) (½ mark for GROUP BY clause) NOTE: Any attribute name with COUNT () to be accepted.																																																	
	(ii) Display the total hours worked on the project named 'Budgeting'.																																																	
Ans	SELECT SUM(HOURS) FROM PROJECTS WHERE PROJECT NAME='Budgeting' ;																																																	

	(½ mark for SELECT part) (½ mark for WHERE clause)																																											
	(iii) Display employee names along with the names of the projects they are working on.																																											
Ans	SELECT EMP_NAME, PROJECT_NAME FROM EMPLOYEES, PROJECTS WHERE EMPLOYEES.EMP_ID=PROJECTS.EMP_ID; OR SELECT EMP_NAME, PROJECT_NAME FROM EMPLOYEES JOIN PROJECTS ON EMPLOYEES.EMP_ID=PROJECTS.EMP_ID; OR SELECT EMP_NAME, PROJECT_NAME FROM EMPLOYEES JOIN PROJECTS WHERE EMPLOYEES.EMP_ID=PROJECTS.EMP_ID; OR SELECT EMP_NAME, PROJECT_NAME FROM EMPLOYEES INNER JOIN PROJECTS ON EMPLOYEES.EMP_ID=PROJECTS.EMP_ID;																																											
	(½ mark for SELECT FROM part) (½ mark for WHERE/ON clause) OR (½ mark for SELECT FROM part) (½ mark for INNER JOIN part)																																											
	OR (b) Consider the following tables : Table 1 : STUDENTS This table stores the details of students in a school. <table><tr><th>StudentID</th><th>StudentName</th><th>Class</th></tr><tr><td>101</td><td>Ananya</td><td>10th</td></tr><tr><td>102</td><td>Rohan</td><td>12th</td></tr><tr><td>103</td><td>Simran</td><td>11th</td></tr><tr><td>104</td><td>Vikram</td><td>10th</td></tr><tr><td>105</td><td>Priya</td><td>12th</td></tr></table> Table 2 : EXAMS This table records the marks obtained by students in their exams. <table><tr><th>ExamID</th><th>StudentID</th><th>Subject</th><th>Marks</th></tr><tr><td>201</td><td>101</td><td>Mathematics</td><td>90</td></tr><tr><td>202</td><td>102</td><td>Physics</td><td>85</td></tr><tr><td>203</td><td>103</td><td>Chemistry</td><td>88</td></tr><tr><td>204</td><td>104</td><td>Biology</td><td>92</td></tr><tr><td>205</td><td>105</td><td>Mathematics</td><td>80</td></tr></table> Write appropriate SQL queries for the following :	StudentID	StudentName	Class	101	Ananya	10th	102	Rohan	12th	103	Simran	11th	104	Vikram	10th	105	Priya	12th	ExamID	StudentID	Subject	Marks	201	101	Mathematics	90	202	102	Physics	85	203	103	Chemistry	88	204	104	Biology	92	205	105	Mathematics	80	
StudentID	StudentName	Class																																										
101	Ananya	10th																																										
102	Rohan	12th																																										
103	Simran	11th																																										
104	Vikram	10th																																										
105	Priya	12th																																										
ExamID	StudentID	Subject	Marks																																									
201	101	Mathematics	90																																									
202	102	Physics	85																																									
203	103	Chemistry	88																																									
204	104	Biology	92																																									
205	105	Mathematics	80																																									

	(i) Calculate the average marks obtained by students in Mathematics.	
Ans	SELECT AVG(Marks) FROM EXAMS WHERE Subject='Mathematics';	
	(½ mark for SELECT part) (½ mark for WHERE clause)	
	(ii) For each class, show the class and the total count of students studying there.	
Ans	SELECT Class, COUNT(*) FROM STUDENTS GROUP BY Class;	
	(½ mark for SELECT part). (½ mark for GROUP BY clause) Note: Any attribute name with COUNT() to be accepted.	
	(iii) Display the student names and their corresponding subjects.	
Ans	SELECT StudentName, Subject FROM STUDENTS, EXAMS WHERE STUDENTS.StudentID = EXAMS.StudentID; OR SELECT StudentName, Subject FROM STUDENTS JOIN EXAMS WHERE STUDENTS.StudentID = EXAMS.StudentID; OR SELECT StudentName, Subject FROM STUDENTS JOIN EXAMS ON STUDENTS.StudentID = EXAMS.StudentID; OR SELECT StudentName, Subject FROM STUDENTS INNER JOIN EXAMS ON STUDENTS.StudentID = EXAMS.StudentID;	
	(½ mark for SELECT part) (½ mark for WHERE/ON clause) OR (½ mark for SELECT part) (½ mark for INNER JOIN)	
	SECTION - D	
33.	You are a data analyst at a retail company. The company wants to analyse its monthly sales data for the year 2024 to identify trends and make informed business decisions. The sales data has the following structure :	4

Month	Sales
Jan	30000
Feb	35000
Mar	40000
Apr	45000
May	50000
Jun	55000
Jul	60000
Aug	65000
Sep	70000
Oct	75000
Nov	80000
Dec	85000

Complete the Python code to generate the following bar chart :



```
import _____ as plt # Statement-1
import pandas as pd
months = ['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun',
          'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec']
sales=[30000,35000,40000,45000,50000,55000,
        60000, 65000, 70000,75000,80000,85000]

plt.bar(_____) # Statement-2
plt.title("_____") # Statement-3
```

	<pre>plt.xlabel("Month") plt.ylabel("_____") # Statement-4 plt.show()</pre> (i) Write the Python code to import the required library, marked as Statement-1. (ii) Write the Python code to draw the bar graph marked as Statement-2. (iii) Write the Python code to add title to the graph marked as Statement-3 (iv) Write Python code to add appropriate ylabel to the graph marked as Statement-4.	
Ans	<pre>import matplotlib.pyplot as plt # Statement-1 import pandas as pd months = ['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec'] sales=[30000,35000,40000,45000,50000,55000,60000, 65000, 70000,75000,80000,85000] plt.bar(months,sales) # Statement-2 plt.title("Monthly Sales Analysis") # Statement-3 plt.xlabel("Month") plt.ylabel("Sales") # Statement-4 plt.show()</pre>	
	<i>(1 mark for correct Statement-1)</i> <i>(1 mark for correct Statement-2)</i> <i>(1 mark for correct Statement-3)</i> <i>(1 mark for correct Statement-4)</i>	
34.	(a) Moulik is a database manager at a retail company. The company maintains a Customer table in their database to track customer information. The Customer table has the following columns : • cusid: Unique identifier (UID) for each customer • cust_name: Name of the customer • city: City where the customer resides • age: Age of the customer • email: Email address of the customer • phone: Phone number of the customer	4

	Table : Customer					
	custid	cust_name	city	age	email	phone
	C01	Rohan	Nagpur	30	rohan@gocoders.com	9997454516
	C02	Saket	Lucknow	45	saket@gocoders.com	9878555414
	C03	Sonal	Nagpur	25	sonal@gocoders.com	8231616161
	C04	Shivika	Indore	35	shivika@gocoders.com	9947166151
	C05	Trisha	Nagpur	28	trishaa@gocoders.com	9957151516
	(i) Write an SQL query to retrieve the list of all customers who are less than 30. Display the custid, cust_name and age.					
Ans	SELECT custid, cust_name, age FROM Customer WHERE age<30;					
	(½ mark for SELECT part) (½ mark for WHERE clause)					
	(ii) Write an SQL query to find the minimum age of all customers from each city.					
Ans	SELECT city, min(age) FROM Customer GROUP BY city;					
	(½ mark for SELECT and MIN() part) (½ mark for GROUP BY clause)					
	(iii) Write an SQL query to find all customers whose city is Nagpur. Display the custid, cust_name and email.					
Ans	SELECT custid, cust_name, email FROM Customer WHERE city = 'Nagpur';					
	(½ mark for SELECT part) (½ mark for WHERE clause)					
	(iv) Write an SQL query to change the phone number of Trisha to 8995715156.					
Ans	UPDATE Customer SET phone = 8995715156 WHERE cust_name = 'Trisha';					
	(½ mark for UPDATE and SET part) (½ mark for WHERE clause)					
	OR (b) Rohit who manages the office supplies, has created a database to track stationery inventory. The database includes a table named STATIONERY whose column (attribute) names are mentioned below: ITEM_ID: Shows the unique ID for each stationery item. ITEM_NAME: Specifies the name of the stationery item. CATEGORY: Indicates the category of the item.					

QTY: Specifies the number of items available in stock.
PUR_DATE: Indicates the date when the item was purchased.

Table : STATIONERY

ITEM_ID	ITEM_NAME	CATEGORY	QTY	PUR_DATE
S001	BALL PEN	WRITING	150	2024-01-15
S002	NOTEBOOK	OFFICE	75	2024-03-10
S003	MARKER	WRITING	40	2024-02-22
S004	FOLDER	OFFICE	200	2024-04-05
S005	GLUE	STATIONERY	30	2024-05-20

Write the output of the following SQL queries :

(i) `Select UPPER(ITEM_NAME) from STATIONERY where CATEGORY = 'WRITING' ;`

Ans

UPPER(ITEM_NAME)
BALL PEN
MARKER

(1 mark for correct output)

(ii) `Select ITEM_NAME from STATIONERY where month(PUR_DATE) = 4 ;`

Ans

ITEM_NAME
FOLDER

(1 mark for correct output)

(iii) `Select ITEM_NAME from STATIONERY where QTY < 50 ;`

Ans

ITEM_NAME
MARKER
GLUE

(1 mark for correct output)

(iv) `Select count(*) from STATIONERY where CATEGORY= 'OFFICE' ;`

Ans	<table><tr><td>count (*)</td></tr><tr><td>2</td></tr></table>	count (*)	2	
count (*)				
2				
	(1 mark for correct output)			
	SECTION - E			
35.	ABC Innovators Pvt. Ltd., Bengaluru is a company specializing in IoT solutions. They have different departments : Research, Development, Marketing and IT Support. The layout of the Bengaluru branch is as follows : RESEARCH DEVELOPMENT MARKETING IT SUPPORT Distance between the departments : • Research to Development : 60 m • Research to Marketing : 80 m • Research to IT Support : 70 m • Development to Marketing : 100 m • Development to IT Support : 90 m • Marketing to IT Support : 110 m Number of computers in each department : • Research : 40 • Development : 120 • Marketing : 100 • IT Support : 20 Based on the above specifications, answer the following questions:	5		
	(i) Suggest the topology and draw the most suitable cable layout for connecting all the departments in the Bengaluru office.			
Ans	Topology : Star Topology			

	<i>(½ mark for correct topology)</i> <i>(½ mark for correct cable layout)</i>	
	(ii) Suggest the type of network (LAN/MAN/WAN) that will be created when the Research department is connected to the Development department. Justify your Answer.	
Ans	Suggested Network Type : LAN Justification : Research and Development departments are within the same campus with a distance of 60 m only.	
	<i>(½ mark for correct Network Type)</i> <i>(½ mark for correct Justification)</i>	
	(iii) Suggest the department for the placement of the server. Explain the reason for your selection.	
Ans	Suggested Department : Development Reason : Development department has the highest number of computers (120), making it a choice for server placement to handle the load efficiently.	
	<i>(½ mark for correct Department)</i> <i>(½ mark for correct Reason)</i>	
	(iv) Suggest the placement of Switch/Hub with justification.	
Ans	Switch/Hub should be placed in all departments as all divisions have more than 1 computer.	
	<i>(½ mark for correct placement)</i> <i>(½ mark for correct Justification)</i>	
	(v) Employees of Bengaluru campus frequently use VoIP technology to communicate to their foreign clients. What is the full form of VoIP ?	

Ans	Voice over Internet Protocol																															
	(1 mark for correct full form)																															
36.	Consider the DataFrame dF shown below : <table><tr><th></th><th>PRODUCTID</th><th>PRODUCTNAME</th><th>CATEGORY</th><th>PRICE</th></tr><tr><td>0</td><td>P001</td><td>Laptop</td><td>Electronics</td><td>60000</td></tr><tr><td>1</td><td>P002</td><td>Mobile Phone</td><td>Electronics</td><td>30000</td></tr><tr><td>2</td><td>P003</td><td>Washing Machine</td><td>Home</td><td>25000</td></tr><tr><td>3</td><td>P004</td><td>Refrigerator</td><td>Home</td><td>40000</td></tr><tr><td>4</td><td>P005</td><td>TV</td><td>Electronics</td><td>45000</td></tr></table> Write Python statement for the DataFrame dF to :		PRODUCTID	PRODUCTNAME	CATEGORY	PRICE	0	P001	Laptop	Electronics	60000	1	P002	Mobile Phone	Electronics	30000	2	P003	Washing Machine	Home	25000	3	P004	Refrigerator	Home	40000	4	P005	TV	Electronics	45000	5
	PRODUCTID	PRODUCTNAME	CATEGORY	PRICE																												
0	P001	Laptop	Electronics	60000																												
1	P002	Mobile Phone	Electronics	30000																												
2	P003	Washing Machine	Home	25000																												
3	P004	Refrigerator	Home	40000																												
4	P005	TV	Electronics	45000																												
	(i) Print the first row of the DataFrame dF.																															
Ans	print(dF.head(1)) OR print(dF.iloc(0)) OR print(dF.loc(0))																															
	(1 mark for the correct statement)																															
	(ii) Display the 'ProductName' column for all products.																															
Ans	print(dF.ProductName) OR print(dF['PRODUCTNAME'])																															
	(1 mark for the correct statement)																															
	(iii) Add a new row with following values : [5 P006 AC HOME 80000]																															
Ans	dF.loc[5]=[5,'P006','AC','HOME',80000]																															
	(1 mark for the correct statement)																															
	(iv) Remove the column 'Category'.																															
Ans	dF.drop('CATEGORY', axis=1, inplace=True) OR del dF['CATEGORY']																															

	(1 mark for the correct statement)	
	(v) Rename the column 'ProductName' to 'Item'.	
Ans	<code>df.rename(columns={'ProductName': 'Item'}, inplace=True)</code>	
	(1 mark for the correct statement)	
37.	(a) Write suitable SQL query for the following :	5
	(i) Display the minimum value in the Salary column from the EMPLOYEES table.	
Ans	<code>SELECT MIN(Salary) FROM EMPLOYEES;</code>	
	(1/2 mark for <i>SELECT MIN()</i> part) (1/2 mark for <i>FROM</i> part)	
	(ii) Display the FirstName column values in lowercase from the EMPLOYEES table.	
Ans	<code>SELECT LOWER(FirstName) FROM EMPLOYEES;</code> OR <code>SELECT LCASE(FirstName) FROM EMPLOYEES;</code>	
	(1/2 mark for <i>SELECT LOWER() / LCASE()</i>) (1/2 mark for <i>FROM</i> part)	
	(iii) Retrieve the DepartmentName column values in uppercase from the DEPARTMENTS table, where the DepartmentName has a length of 7 characters.	
Ans	<code>SELECT UPPER(DepartmentName) FROM DEPARTMENTS</code> <code>WHERE LENGTH(DepartmentName)=7;</code> OR <code>SELECT UCASE(DepartmentName) FROM DEPARTMENTS</code> <code>WHERE LENGTH(DepartmentName)=7;</code>	
	(1/2 mark for <i>SELECT UPPER() / UCASE() FROM</i> part) (1/2 mark for <i>WHERE</i> clause)	
	(iv) Show the remainder when dividing each value in the Salary column by 1000 in the EMPLOYEES table.	
Ans	<code>SELECT MOD(Salary,1000) FROM EMPLOYEES;</code>	
	(1/2 mark for <i>SELECT MOD()</i>) (1/2 mark for <i>FROM</i> clause)	

	(v) Count the rows in the EMPLOYEES table where Salary is greater than 50000.	
Ans	SELECT COUNT(*) FROM EMPLOYEES WHERE Salary > 50000;	
	<i>(½ mark for SELECT part)</i> <i>(½ mark for WHERE clause)</i>	
	OR	
	(b) Write suitable SQL queries for the following :	
	(i) Find the power of 5 raised to 3.	
Ans	SELECT POWER(5,3) ; OR SELECT POW(5,3) ;	
	<i>(½ mark for SELECT)</i> <i>(½ mark for correct use of POWER() / POW())</i>	
	(ii) Convert the string 'DATA ANALYSIS' to lowercase.	
Ans	SELECT LOWER('DATA ANALYSIS') ; OR SELECT LCASE('DATA ANALYSIS') ;	
	<i>(½ mark for SELECT)</i> <i>(½ mark for LOWER() / LCASE())</i>	
	(iii) Display the first 4 characters of the string 'Information'.	
Ans	SELECT SUBSTRING('Information',1,4) ; OR SELECT SUBSTR('Information',1,4) ; OR SELECT LEFT('Information', 4) ;	
	<i>(½ mark for SELECT)</i> <i>(½ mark for SUBSTRING() / SUBSTR() / LEFT())</i>	
	(iv) Extract the year from the date '1995-11-15'.	
Ans	SELECT YEAR('1995-11-15') ; OR SELECT LEFT('1995-11-15',4) ;	

	OR SELECT SUBSTR('1995-11-15',1,4); OR SELECT MID('1995-11-15',1,4);	
	(<i>½ mark for SELECT</i>) (<i>½ mark for extracting the year part</i>)	
	(v) Display the number of characters in the string 'Cyber Security'	
Ans	SELECT LENGTH('Cyber Security'); OR SELECT LENGTH('CyberSecurity');	
	(<i>½ mark for SELECT</i>) (<i>½ mark for LENGTH()</i>)	