

# Marking Scheme (English Version)

## Strictly Confidential

(For internal and restricted use only)

Senior Secondary School Examination 2026

SUBJECT NAME: INFORMATICS PRACTICES SUBJECT CODE: 065 (Set 4 Q.P. CODE 90)

### General Instructions:

1	The CBSE has decided to introduce On Screen Marking (OSM) for the evaluation of Class XII answer Book with the 2026 Examination.
2	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.
3	“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 the 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 Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”
4	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. <b>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 the given answer and even if the reply is not from the marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.</b>
5	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.
6	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.
7	Evaluators will mark ( ✓ ) wherever the answer is correct. For wrong answers CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. <b>This is the most common mistake which evaluators are committing.</b>
8	If a question has parts, please award marks on the right-hand side for each part in the OSM Portal. Marks awarded for different parts of the question will be totaled up by the OSM System.
9	If a question does not have any parts, marks must be awarded in the left-hand margin in the OSM Portal. This may also be followed strictly.

10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of 70 marks has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	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.
13	<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past :-</p> <ul style="list-style-type: none"> <li>• 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 answers.)</li> <li>• Half or a part of the answer marked correct and the rest as wrong, but no marks awarded.</li> </ul>
14	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.
15	The Examiners should acquaint themselves with the guidelines given in the “ <b>Guidelines for Spot Evaluation</b> ” before starting the actual evaluation.
16	The candidates are entitled to obtain a 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.
17	<b>If a candidate attempts both alternatives/options in a question where only one option/alternative is required to be attempted, the Evaluator shall award marks in both the options. The system will take the higher of two scores and disregard the other response.</b>
18	<b>In a question having two options/alternatives, if a candidate has attempted only one, then the evaluator shall mark “NA” (Not attempted) against the option that has not been attempted by the candidate.</b>

# MARKING SCHEME

## INFORMATICS PRACTICES 065

Max. Marks: 70

### General Instructions :

- (i) All questions are compulsory.
- (ii) The examination contains 5 sections - Section A to Section E.
- (iii) Section A consists of 21 questions (1 to 21). Each question carries 1 mark.
- (iv) Section B consists of 7 questions (22 to 28). Each question carries 2 marks.
- (v) Section C consists of 4 questions (29 to 32). Each question carries 3 marks.
- (vi) Section D consists of 2 questions (33 to 34). Each question carries 4 marks.
- (vii) Section E consists of 3 questions (35 to 37). Each question carries 5 marks.
- (viii) Internal choices have been provided in some questions. Attempt only one of the choices in such questions.
- (ix) All programming questions are to be answered using Python Language only.
- (x) In case of MCQs, text of the correct answer should also be written.

### Specific Instructions:

- The answers given in the marking scheme are SUGGESTIVE. Examiners are requested to award marks for all alternative correct Solutions/Answers conveying a similar meaning
- All programming questions have to be answered with respect to Python only
- In Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, the number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions - ignore case sensitivity

- In SQL output questions - ignore the column headers
- In SQL output questions - ignore the order of rows until **ORDER BY** is specified

SECTION - A		
1.	State whether the following statement is True or False : In Pandas Series, the Positional index can be a string or an integer.	1
Ans	<b>False</b>	
	<i>(1 mark for writing the correct answer)</i>	
2.	We can add a new row to a DataFrame <b>DF</b> using the _____ method. (A) <b>DF.add()</b> (B) <b>DF.loc[]</b> (C) <b>DF.loc()</b> (D) <b>DF.addloc[]</b>	1
Ans	(B) <b>DF.loc[]</b>	
	<i>(1 Mark for writing the correct option)</i>	
3.	Naveen discarded various types of waste material without realizing that e-waste contains harmful substances that could pollute the environment. He wants to know which of the following will be considered as e-waste ? (A) Plastic Bottle (B) Broken Smartphone (C) Aluminium Foil (D) Banana Peel	1
Ans	(B) Broken Smartphone	
	<i>(1 Mark for writing the correct option)</i>	
4.	In which scenario is a bar chart preferred over a line chart ? (A) To visualise monthly temperature trends over a year. (B) To compare the number of students in different classes. (C) To show stock price movements over time. (D) To analyse trends in website traffic over days.	1
Ans	(B) To compare the number of students in different classes	
	<i>(1 Mark for writing the correct option)</i>	
5.	Which of the following network topology uses a central cable (backbone) to connect all devices? (A) Mesh (B) Star	1

	(C) Tree (D) Bus	
Ans	(D) Bus	
	<b>(1 Mark for writing the correct option)</b>	
6.	State whether the following statement is True or False : In SQL, an aggregate function returns multiple values for each column on which it is applied.	1
Ans	False	
	<b>(1 Mark for writing the correct answer)</b>	
7.	Rohini has developed a new kind of water purifier that uses a unique filtration method. Which type of Intellectual Property Right should she apply to protect her invention ? (A) Trademark (B) Copyright (C) Patent (D) Both Copyright & Trademark	1
Ans	(C) Patent	
	<b>(1 Mark for writing the correct option)</b>	
8.	Aditya is working on a <b>DataFrame</b> named <b>df</b> . He has written the statement : <code>print(df.loc['S2'])</code> What will the above statement do ? (A) Display the data of the row having label 'S2'. (B) Display the columns of the <b>DataFrame</b> . (C) Display the data type of the column having label 'S2'. (D) Display the index numbers of the <b>DataFrame</b> .	1
Ans	(A) Display the data of the row having label 'S2'.	
	<b>(1 Mark for writing the correct option)</b>	
9.	What will be the result of the following SQL command ? <b>SELECT LENGTH ('Data Base');</b> (Note: There is a single space between the words <b>Data</b> and <b>Base</b> .) (A) 7 (B) 8 (C) 9 (D) Error	1
Ans	(C) 9	
	<b>(1 Mark for writing the correct option)</b>	
10.	Which of the following is a key feature of a Static Web Page ? (A) Its content updates very frequently. (B) It displays different content to different users.	1

	(C) It loads slower than a Dynamic Web Page. (D) It shows the same content unless the code is manually updated.	
Ans	(D) It shows the same content unless the code is manually updated.	
	<b>(1 Mark for writing the correct option)</b>	
11.	Which of the following is the correct expanded form of DML ? (A) Device Management Language (B) Device Manipulation Language (C) Data Management Language (D) Data Manipulation Language	1
Ans	(D) Data Manipulation Language	
	<b>(1 Mark for writing the correct option)</b>	
12.	CSV stands for _____ Separated Values. (A) Colon (B) CTRL (C) Comma (D) Caret	1
Ans	(C) Comma	
	<b>(1 Mark for writing the correct option)</b>	
13.	Which of the following is an example of maintaining good net etiquette ? (A) Spamming emails or messages to strangers. (B) Ignoring other's opinions in online discussions. (C) Not using copyrighted materials without permission of the owner. (D) Sharing someone's private information publicly.	1
Ans	(C) Not using copyrighted materials without permission of the owner.	
	<b>(1 Mark for writing the correct option)</b>	
14.	In the context of creating a Pandas Series from a dictionary, which of the following statement is correct ? (A) The values of the dictionary become the indices of the Series. (B) The keys of the dictionary become the values of the Series. (C) The keys of the dictionary become the indices of the Series. (D) The Series will have default integer indices starting from 0, ignoring the dictionary keys.	1
Ans	(C) The keys of the dictionary become the indices of the Series	
	<b>(1 Mark for writing the correct option)</b>	
15.	In Pandas, when extracting a portion of a Series <code>ser1</code> using <code>ser1[start:end]</code> with	1

	positional indices <b>start</b> and <b>end</b> , which of the following statements is true ? (A) The element at the <b>end</b> index is included in the output. (B) The element at the <b>end</b> index is excluded from the output. (C) The elements at both the <b>start</b> and <b>end</b> indices are excluded from the output. (D) The element at the <b>start</b> index is excluded from the output.	
Ans	(B) The element at the end index is excluded from the output.	
	<b>(1 Mark for the correct answer)</b>	
16.	Nisha is using an Android app to make a voice call over the internet to her friend in another country. Which protocol is being used in this case ? (A) Chat (B) VoIP (C) Email (D) TV	1
Ans	(B) VoIP	
	<b>(1 Mark for the correct answer)</b>	
17.	State whether the following statement is True or False : The <b>INSTR(string1, string2)</b> function in SQL returns 0 if <b>string2</b> is not present as a substring in <b>string1</b> .	1
Ans	True	
	<b>(1 Mark for the correct answer)</b>	
18.	In a Pandas <b>DataFrame</b> , which value for the axis will be used to delete a column ? (A) <b>axis = -1</b> (B) <b>axis = 0</b> (C) <b>axis = 1</b> (D) <b>axis = 2</b>	1
Ans	(C) <b>axis = 1</b>	
	<b>(1 Mark for the correct answer)</b>	
19.	What will be the result of the following SQL command : <b>SELECT ROUND (15.678, 2) ;</b> (A) 15.00 (B) 15.67 (C) 15.68 (D) 16.00	1
Ans	(C) 15.68	
	<b>(1 Mark for the correct answer)</b>	
	Q. 20 and Q. 21 are Assertion (A) and Reason (R) Type questions. Choose the correct option as : (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.	
20.	<b>Assertion (A) :</b> Pandas DataFrame can store values of multiple data types in multiple Columns. <b>Reason (R) :</b> DataFrames are implemented using 2D arrays, which allows only numeric values.	1
Ans	(C) (A) is True, but (R) is False.	
	<b>(1 Mark for writing the correct option)</b>	
21.	<b>Assertion (A) :</b> The output of the SQL query <code>SELECT COUNT (name) FROM students;</code> will differ from the output of <code>SELECT COUNT (*) FROM students;</code> if there are some NULL values in the name column. <b>Reason (R) :</b> <code>COUNT (column_name)</code> returns the count of NON NULL values in that column, whereas <code>COUNT (*)</code> returns the number of records in the table.	1
Ans	(A) Both (A) and (R) are True, and (R) correctly explains (A).	
	<b>(1 Mark for writing the correct option)</b>	
<b>SECTION - B</b>		
22.	(a) List any two characteristics of Pandas library in Python.	2
Ans	(a) Characteristics of Pandas library in Python: <b>Tabular data structure :</b> Works with data in the form of DataFrames (tables) and Series <b>Easy data handling:</b> Allows quick reading, writing, and modification of data <b>Powerful data analysis :</b> Supports filtering, sorting, grouping, and calculations <b>Handles missing data :</b> Can easily detect and fill/remove missing values <b>Fast and efficient :</b> Works well even with large datasets <b>Supports multiple file formats :</b> Can read/write multiple file formats like CSV, Excel.	
	<b>(1 Mark each for writing any two correct characteristics)</b>	
	<b>OR</b>	
	(b) Briefly explain the purpose of Boolean Indexing with respect to DataFrames. Support your answer with a suitable example.	
Ans	(b) Boolean Indexing is used to filter and extract specific rows from a DataFrame based on given condition(s). It returns only those rows where the condition is True.  <b>Example:</b> <pre>import pandas as pd data = {'Name': ['Ajay', 'Riya', 'David', 'Peter'],         'Age': [25, 30, 35, 40], 'Score': [85, 90, 95, 80]} df = pd.DataFrame(data) condition = df['Age'] &gt; 30 result = df[condition]</pre>	



	<pre>print(result)</pre> <b>Output</b> <table><tr><td></td><td><b>Name</b></td><td><b>Age</b></td><td><b>Score</b></td></tr><tr><td>2</td><td>David</td><td>35</td><td>95</td></tr><tr><td>3</td><td>Peter</td><td>40</td><td>80</td></tr></table>		<b>Name</b>	<b>Age</b>	<b>Score</b>	2	David	35	95	3	Peter	40	80	
	<b>Name</b>	<b>Age</b>	<b>Score</b>											
2	David	35	95											
3	Peter	40	80											
	<p><i>(1 Mark for explaining the purpose of Boolean Indexing and 1 Mark for writing any correct example)</i></p> <p><b>Note:</b></p> <p><b>Full 2 marks if indexing is explained only using example with correct condition (with or without output).</b></p>													
23.	Anjana had created a website using free design elements sourced from different creators online. She then published the site for public access but did not mention the source of the design elements used. (i) Identify one possible violation of IPR in this situation, (ii) Name any two licensing models that allow legal reuse of digital creative work with conditions.	2												
Ans	(i) Copyright Infringement/Copyright Violation (ii) Creative Commons (CC) licenses, GNU General Public License (GPL)													
	<p><b>(1 Mark for part (i) and ½ mark for writing each correct example in part (ii))</b></p> <p><b>NOTE: Open Source to be accepted for part (ii)</b></p>													
24.	Define the following terms with respect to RDBMS : a. Domain b. Tuple	2												
Ans	a. Domain: The set of all possible values that a column (attribute) can contain. b. Tuple: A row in a table representing a complete record.													
	<p><b>a. (1 Mark for writing the correct definition of Domain)</b></p> <p><b>b. (1 Mark for writing the correct definition of Tuple)</b></p>													
25.	(a) Explain the role of the following network devices in a network : (I) Modem (II) Gateway	2												
Ans	(a) (I) Modem: Converts digital signals into analog signals and vice versa. (II) Gateway: A gateway acts as a bridge between two different networks.													
	<p><b>(1 Mark for explaining correct role of Modem)</b></p> <p><b>(1 Mark for explaining correct role of Gateway)</b></p>													
	<p style="text-align: center;"><b>OR</b></p> <p>(b) Differentiate between add-ons and plug-ins in a web browser.</p>													
Ans	<table><tr><td colspan="2">(b)</td></tr><tr><td>Add-ons</td><td>Plug-ins</td></tr><tr><td><ul style="list-style-type: none"><li>Add-ons enhance or customize the browser like adding features, blocking ads, managing passwords, etc.</li></ul></td><td><ul style="list-style-type: none"><li>Plug-ins are designed to enable the browser to handle specific types of content.</li><li>Example: Adobe Flash Player</li></ul></td></tr></table>	(b)		Add-ons	Plug-ins	<ul style="list-style-type: none"><li>Add-ons enhance or customize the browser like adding features, blocking ads, managing passwords, etc.</li></ul>	<ul style="list-style-type: none"><li>Plug-ins are designed to enable the browser to handle specific types of content.</li><li>Example: Adobe Flash Player</li></ul>							
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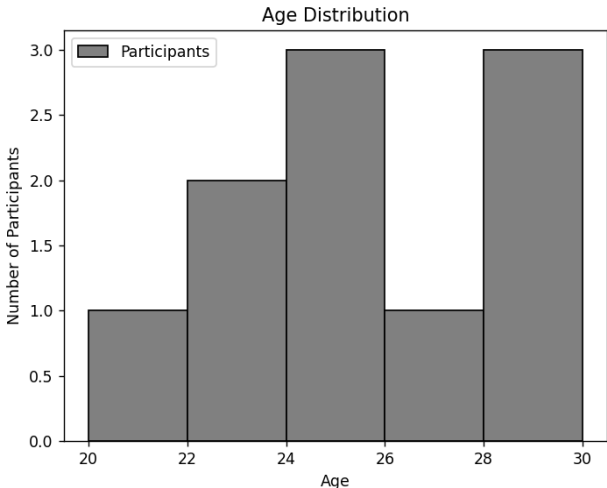
	<ul style="list-style-type: none"> <li>Example: Mozilla Firefox add-ons like ad blockers or theme changers.</li> </ul>	
	<b>(2 Marks for differentiating between Add-ons and Plug-ins)</b> <b>(Full 2 marks to be awarded if difference explained through example)</b> <b>Note: 1 mark to be awarded if either Add-ons or Plug-ins is explained</b>	
26.	Write SQL queries to perform the following : (I) Display the month (in numeric form) of the date '2026-01-01'. (II) Display only the year part from the date '2026-01-01'.	2
Ans	(I) <code>SELECT MONTH('2026-01-01');</code> (II) <code>SELECT YEAR('2026-01-01');</code>	
	<b>(I) (½ mark for writing SELECT, ½ mark for MONTH('2026-01-01'))</b> <b>(II) (½ mark for writing SELECT, ½ mark for YEAR('2026-01-01'))</b>	
27.	(a) What is data protection ? (b) Mention any two precautionary measures one can take to avoid the risk of cybercrime.	2
Ans	(a) Data protection refers to the practice of safeguarding data from unauthorized access, misuse, loss, or damage.	
	<b>(1 Mark for writing the correct definition of data protection)</b>	
	(b) Precautions to avoid cybercrime (Any two): (i) Use strong passwords and do not share them. (ii) Avoid clicking on suspicious links or emails. (iii) Install and regularly update antivirus software. (iv) Do not share personal or sensitive information online.	
	<b>(½ Mark for writing each correct precaution)</b>	
28.	(a) Niharika wants to create a Pandas <b>Series</b> using a <b>NumPy</b> array with three elements 'a', 'b', and 'c', and assign custom indexes 'first', 'second' and 'third'. Help her complete the code below. <pre>import pandas as pd import _____ as np arr = np._____(['a', 'b', 'c']) s = pd._____ (arr, _____=['first', 'second', 'third']) print(s)</pre>	2
Ans	(a) <pre>import pandas as pd import <u>numpy</u> as np arr = np.<u>array</u>(['a', 'b', 'c']) s = pd.<u>Series</u>(arr, <u>index</u>=['first', 'second', 'third']) print(s)</pre>	
	<b>(½ Mark for filling each blank correctly)</b>	
Ans	<p style="text-align: center;"><b>OR</b></p> (b) Write the output of the following code: <pre>import pandas as pd s1 = pd.Series ([1,2,3], index = ['a', 'b', 'c'])</pre>	

	<pre>s2 = pd.Series ([4,5,6], index = ['b','c','d']) print(s1 + S2)</pre>	
	<b>(b)</b> a NaN b 6.0 c 8.0 d NaN	
	<p><i>(½ Mark for writing each correct row of output)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Full 2 marks to be awarded if <b>ERROR</b> in code is mentioned, as in print() statement S2 is in uppercase</li> <li>• Mentioning "dtype:float64" in the output to be ignored.</li> <li>• 1 mark for writing either of the correct column of output</li> <li>• ½ Mark for any 2 correct values in the given output</li> </ul>	
<b>SECTION - C</b>		
29.	<p>Mandeep received an email stating he won a lottery though he had never participated in any such event. He was asked to provide bank details to process the amount. Mandeep provided the required details but within next few minutes ₹ One lakh was debited from his account.</p> <p>Answer the following questions based on the given case study :</p>	3
	(i) Mandeep is the victim of which type of cybercrime ?	
Ans	(i) Mandeep is a victim of Phishing.	
	<p><b>(1 Mark for writing correct type of cybercrime)</b></p> <p><b>Note: Online Fraud/Scam to be accepted.</b></p>	
	(ii) Other than email, mention any two common methods through which this type of cybercrime is being committed these days.	
Ans	<p>(ii) Common methods through which this type of cybercrime is being committed are as follows:</p> <p>SMS Voice calls Social Media Fake Websites Whatsapp messages</p>	
	<b>(½ Mark each for mentioning Any two correct methods of cybercrime)</b>	
	(iii) Name one law that safeguards the rights of Internet users in India.	
Ans	<p>(iii) Information Technology (IT) Act 2000 OR IT Act</p>	
	<b>(1 Mark for naming the correct law)</b>	
30.	<p>(a) Write a Python program to create and display a Pandas Series as shown below :</p> <pre>July      31 Aug       31 Sept     30 Oct      31</pre> <p>The index labels are the names of the months - July, Aug, Sept, Oct.</p>	3

	The corresponding scalar values are the number of days in these respective months - 31, 31, 30, 31.																
Ans	<pre>import pandas as pd months = ['July', 'Aug', 'Sept', 'Oct'] days = [31, 31, 30, 31] s = pd.Series(days, index=months) OR s = pd.Series(days, months) print(s) OR import pandas as pd days = pd.Series(data=[31, 31, 30, 31],                   index=['July', 'Aug', 'Sept', 'Oct'] ) print(days)  OR import pandas as pd days = pd.Series({'July':31, 'Aug':31, 'Sept':30, 'Oct':31}) print(days)</pre>																
	<i>(½ Mark for correct import statement)</i> <i>(½ Mark for creating index of months)</i> <i>(½ Mark for creating corresponding values of days)</i> <i>(1 Mark for pd.Series( ))</i> <i>(½ Mark for correct print statement)</i>																
	<p style="text-align: center;"><b>OR</b></p> <p>(b) A CSV file named <code>customer.csv</code> contains records of customers. The first row of the file represents the header. Sample data from the file is shown below :</p> <pre>Name, Age, City Rudra,17,Kolkata Divya,19,Dehradun Nabeel,22,Lucknow</pre> <p>Write a Python program to import data from the CSV file into a Pandas DataFrame named <code>DF</code> and display the last two rows.</p>	3															
Ans	<pre>(b) import pandas as pd DF = pd.read_csv("customer.csv") print(DF.tail(2))</pre>																
	<i>(1 Mark for each correct statement)</i> <i>Note: ignore Path of csv file if mentioned by the student</i>																
31.	<p>(i) Write an SQL statement to create a table named <b>PRODUCTS</b> with the following specifications :</p> <table border="1"> <thead> <tr> <th>Column Name</th><th>Data Type</th><th>Key</th></tr> </thead> <tbody> <tr> <td>PID</td><td>Integer</td><td>Primary Key</td></tr> <tr> <td>PName</td><td>Varchar of size 30</td><td></td></tr> <tr> <td>PCat</td><td>Char of size 15</td><td></td></tr> <tr> <td>Price</td><td>Decimal Number</td><td></td></tr> </tbody> </table>	Column Name	Data Type	Key	PID	Integer	Primary Key	PName	Varchar of size 30		PCat	Char of size 15		Price	Decimal Number		3
Column Name	Data Type	Key															
PID	Integer	Primary Key															
PName	Varchar of size 30																
PCat	Char of size 15																
Price	Decimal Number																
Ans	<pre>CREATE TABLE PRODUCTS (   PID INT PRIMARY KEY,   PName VARCHAR(30) ,   PCAT CHAR(15) ,   PRICE FLOAT</pre>																

	) ;																																											
	(½ Mark for <i>CREATE TABLE PRODUCTS</i> ) (½ Mark for correct attributes and datatypes) (½ Mark for Primary Key)																																											
	(ii) Write an SQL query to increase the price of all the items by 100, whose product category is <b>Grocery</b> , in the table <b>PRODUCTS</b> .																																											
Ans	UPDATE PRODUCTS SET PRICE=PRICE+100 WHERE PCAT='Grocery' ;																																											
	(½ Mark for writing UPDATE PRODUCTS) (½ Mark for SET PRICE=PRICE+100) (½ Mark for WHERE PCAT='Grocery')																																											
32.	<p>(a) Consider the following tables :</p> <p><b>Table 1 : TEACHER</b>, which stores Teacher ID (<b>TID</b>) , Teacher Name (<b>TName</b>) , Experience (<b>Experience</b>) and City (<b>City</b>) that they live in.</p> <table><tr><th>TID</th><th>TName</th><th>Experience</th><th>City</th></tr><tr><td>1</td><td>Kartik</td><td>5</td><td>Bhopal</td></tr><tr><td>2</td><td>Shahnaz</td><td>6</td><td>Nagpur</td></tr><tr><td>3</td><td>Rajendra</td><td>7</td><td>Delhi</td></tr><tr><td>4</td><td>Tanvi</td><td>4</td><td>Bhopal</td></tr><tr><td>5</td><td>Alam</td><td>9</td><td>Delhi</td></tr></table> <p><b>Table 2 : SUBJECT</b>, which stores Subject ID (<b>SID</b>) , Subject Name (<b>SubName</b>) and ID of the teacher (<b>TID</b>) teaching that Subject.</p> <table><tr><th>SID</th><th>SubName</th><th>TID</th></tr><tr><td>101</td><td>Physics</td><td>1</td></tr><tr><td>102</td><td>Chemistry</td><td>2</td></tr><tr><td>103</td><td>Mathematics</td><td>3</td></tr><tr><td>104</td><td>Informatics Practices</td><td>4</td></tr><tr><td>105</td><td>Computer Science</td><td>5</td></tr></table> <p>Write appropriate SQL query for the following:</p>	TID	TName	Experience	City	1	Kartik	5	Bhopal	2	Shahnaz	6	Nagpur	3	Rajendra	7	Delhi	4	Tanvi	4	Bhopal	5	Alam	9	Delhi	SID	SubName	TID	101	Physics	1	102	Chemistry	2	103	Mathematics	3	104	Informatics Practices	4	105	Computer Science	5	3
TID	TName	Experience	City																																									
1	Kartik	5	Bhopal																																									
2	Shahnaz	6	Nagpur																																									
3	Rajendra	7	Delhi																																									
4	Tanvi	4	Bhopal																																									
5	Alam	9	Delhi																																									
SID	SubName	TID																																										
101	Physics	1																																										
102	Chemistry	2																																										
103	Mathematics	3																																										
104	Informatics Practices	4																																										
105	Computer Science	5																																										
	(I) Delete the record of the subject whose <b>TID</b> is equal to 4.																																											
Ans	(I) DELETE FROM SUBJECT WHERE TID = 4 ;																																											
	(½ Mark for <i>DELETE FROM SUBJECT</i> ) (½ Mark for <i>WHERE TID=4</i> )																																											
	(II) Display the names of teachers who have more than 5 years of experience and who stay in <b>Nagpur</b> .																																											
Ans	(II) SELECT TNAME FROM TEACHER WHERE EXPERIENCE>5 AND CITY = 'Nagpur' ;																																											

	(½ Mark for SELECT TNAME FROM TEACHER) (½ Mark for WHERE EXPERIENCE>5 AND CITY='Nagpur')																					
	(III) Display subject names along with their teacher names.																					
Ans	(III) SELECT SUBNAME, TNAME FROM SUBJECT NATURAL JOIN TEACHER;  OR SELECT SUBNAME, TNAME FROM SUBJECT, TEACHER WHERE SUBJECT.TID = TEACHER.TID;  OR SELECT SUBNAME, TNAME FROM SUBJECT S, TEACHER T WHERE S.TID = T.TID;  OR SELECT SUBNAME, TNAME FROM SUBJECT S JOIN TEACHER T ON S.TID = T.TID;																					
	(½ Mark SELECT SUBNAME, TNAME FROM SUBJECT, TEACHER) (½ Mark NATURAL JOIN TEACHER OR WHERE SUBJECT.TID=TEACHER.TID)																					
	OR (b) Consider the table LIBRARY as given below. <table><tr><th>BookId</th><th>Title</th><th>Genre</th><th>Price</th></tr><tr><td>101</td><td>Python Basics</td><td>Technology</td><td>278</td></tr><tr><td>201</td><td>The Silent Patient</td><td>Fiction</td><td>340</td></tr><tr><td>301</td><td>Data Science</td><td>Technology</td><td>291</td></tr><tr><td>401</td><td>Oceans</td><td>Marine Life</td><td>NULL</td></tr></table>	BookId	Title	Genre	Price	101	Python Basics	Technology	278	201	The Silent Patient	Fiction	340	301	Data Science	Technology	291	401	Oceans	Marine Life	NULL	
BookId	Title	Genre	Price																			
101	Python Basics	Technology	278																			
201	The Silent Patient	Fiction	340																			
301	Data Science	Technology	291																			
401	Oceans	Marine Life	NULL																			
	(I) Which attribute(s) can be considered as the Candidate keys(s)? Justify your answer.																					
Ans	(I) BookId BookId is unique to every row of table. NOTE: BookId and Title to be accepted with correct justification																					
	(½ Mark for writing correct attribute) (½ Mark for Justification)																					
	(II) Write an SQL query to insert a new record with the following values: BookId : 501 Title : AI for ALL Genre : Technology Price : 589																					
Ans	(II) INSERT INTO LIBRARY VALUES (501, 'AI for ALL', 'Technology', 589);  OR INSERT INTO LIBRARY (BookId, Title, Genre, Price) VALUES (501, 'AI for ALL', 'Technology', 589);																					
	(½ Mark for INSERT INTO LIBRARY) (½ Mark for VALUES ((501, 'AI for ALL', 'Technology', 589);)																					

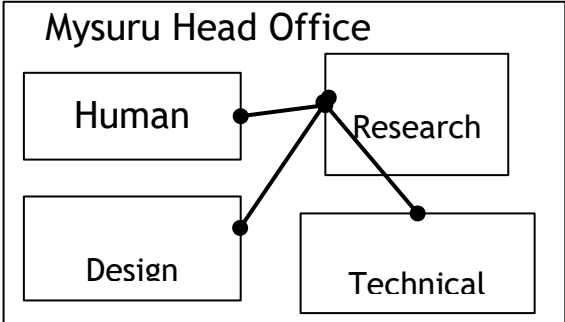
	(III) Write an SQL query to add a new column <b>Author</b> that is a character data type of size 20.	
Ans	(III) <code>ALTER TABLE LIBRARY ADD COLUMN AUTHOR VARCHAR(20);</code> <b>OR</b> <code>ALTER TABLE LIBRARY ADD AUTHOR VARCHAR(20);</code> <b>OR</b> <code>ALTER TABLE LIBRARY ADD COLUMN AUTHOR CHAR(20);</code> <b>OR</b> <code>ALTER TABLE LIBRARY ADD AUTHOR CHAR(20);</code>	
	<i>(½ Mark for ALTER TABLE LIBRARY)</i> <i>(½ Mark for ADD AUTHOR VARCHAR(20)/CHAR(20))</i>	
<b>SECTION - D</b>		
33.	<p>Ms. Anjali, a data analyst, has been assigned the task of creating a histogram to display the age distribution of ten participants in a workshop. She has been provided with the following list of their ages :</p> <p><b>Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23]</b></p> <p>She has started writing a Python program for it. However, the code is incomplete. Help her complete the program by filling in the missing parts, so that the histogram as shown below is displayed.</p> 	4
	<pre> import matplotlib.pyplot as plt Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23] binsize = [20,22,24,26,28,30] plt._____(Ages, bins=binsize, edgecolor = 'black', label = 'Participants')           # Statement-1 _____.xlabel('Age')       # Statement-2 plt.ylabel('Number of Participants') plt.title("Age Distribution") plt._____              # Statement-3 _____                  # Statement-4 </pre>	
(I)	Write the suitable code for the blank space in the line marked as <b>Statement-1</b> which plots the histogram.	
Ans	<b>hist</b>	

	(1 Mark for mentioning hist)																										
(II)	Fill in the blank in <b>Statement-2</b> to use the correct alias of the required module to set the label on x-axis.																										
Ans	plt																										
	(1 Mark for mentioning plt)																										
(III)	Fill in the blank in <b>Statement-3</b> with the correct Python code to display the legend on the graph.																										
Ans	legend()																										
	(1 Mark for mentioning legend()) Note: ½ mark to be awarded if legend is mentioned without ()																										
(IV)	Fill in the blank in <b>Statement-4</b> with the appropriate Python code to display the graph.																										
Ans	plt.show()																										
	(1 Mark for mentioning plt.show()) Note: ½ mark to be awarded for plt, ½ mark for show(), if plt.show is mentioned without () ½ mark should be awarded																										
34.	<p>(a) Shalini, who works as a database designer in the hotel industry, has created a table named <b>Guest</b> to keep track of guest details as shown below :</p> <p style="text-align: center;">Table : Guest</p> <table><tr><th>GuestID</th><th>GuestName</th><th>RoomNumber</th><th>CheckInDate</th><th>Charges</th></tr><tr><td>G101</td><td>Harish</td><td>101</td><td>2025-04-03</td><td>3000</td></tr><tr><td>G102</td><td>Sunita</td><td>101</td><td>2025-04-03</td><td>3000</td></tr><tr><td>G103</td><td>Ramesh</td><td>102</td><td>2025-05-04</td><td>5000</td></tr><tr><td>G104</td><td>Bhumika</td><td>103</td><td>2025-06-02</td><td>3500</td></tr></table> <p>Write a suitable SQL query for the following :</p>	GuestID	GuestName	RoomNumber	CheckInDate	Charges	G101	Harish	101	2025-04-03	3000	G102	Sunita	101	2025-04-03	3000	G103	Ramesh	102	2025-05-04	5000	G104	Bhumika	103	2025-06-02	3500	4
GuestID	GuestName	RoomNumber	CheckInDate	Charges																							
G101	Harish	101	2025-04-03	3000																							
G102	Sunita	101	2025-04-03	3000																							
G103	Ramesh	102	2025-05-04	5000																							
G104	Bhumika	103	2025-06-02	3500																							
(I)	Display last 3 characters of guest name in upper case.																										
Ans	SELECT UPPER(RIGHT(GuestName, 3)) FROM Guest; OR SELECT UPPER(SUBSTR(GuestName, -3)) FROM Guest; OR SELECT UPPER(SUBSTRING(GuestName, -3)) FROM Guest;																										
	(½ Mark for RIGHT() OR SUBSTR() OR SUBSTRING()) (½ Mark for UPPER() /UCASE())																										
(II)	Display the name of the guest along with the day name of check-in date.																										
Ans	SELECT GuestName, DAYNAME(CheckInDate) FROM Guest;																										
	(½ Mark for SELECT GuestName) (½ Mark for DAYNAME())																										
(III)	Display the remainder when charges are divided by 1000.																										
Ans	SELECT MOD(Charges,1000) FROM Guest;																										
	(½ Mark for SELECT)																										



	(½ Mark for MOD ( ))																										
(IV)	Extract and display three characters, starting from the second character, of each guest name.																										
Ans	SELECT SUBSTR(GuestName,2,3) FROM Guest; OR SELECT MID(GuestName,2,3) FROM Guest;																										
	(½ Mark for SELECT) (½ Mark for SUBSTR ( ) / MID ( ))																										
	<div>OR</div> <div>(b) Consider the following table and write the output of the following SQL Queries.</div> <div>Table : ORDERS</div> <table><tr><th>ORDERID</th><th>CUSTOMERNAME</th><th>TOTALAMOUNT</th><th>DISCOUNT</th><th>ORDERDATE</th></tr><tr><td>101</td><td>Hemant</td><td>5000</td><td>10</td><td>2024-03-01</td></tr><tr><td>102</td><td>Neha</td><td>7000</td><td>15</td><td>NULL</td></tr><tr><td>103</td><td>Keshav</td><td>3000</td><td>5</td><td>2024-01-20</td></tr><tr><td>104</td><td>Sandhya</td><td>4500</td><td>NULL</td><td>2023-12-25</td></tr></table> <div>Write the output of the following SQL Queries :</div>	ORDERID	CUSTOMERNAME	TOTALAMOUNT	DISCOUNT	ORDERDATE	101	Hemant	5000	10	2024-03-01	102	Neha	7000	15	NULL	103	Keshav	3000	5	2024-01-20	104	Sandhya	4500	NULL	2023-12-25	
ORDERID	CUSTOMERNAME	TOTALAMOUNT	DISCOUNT	ORDERDATE																							
101	Hemant	5000	10	2024-03-01																							
102	Neha	7000	15	NULL																							
103	Keshav	3000	5	2024-01-20																							
104	Sandhya	4500	NULL	2023-12-25																							
I.	SELECT CUSTOMERNAME FROM ORDERS WHERE DISCOUNT IS NOT NULL;																										
Ans	<table><tr><th>CUSTOMERNAME</th></tr><tr><td>Hemant</td></tr><tr><td>Neha</td></tr><tr><td>Keshav</td></tr></table>	CUSTOMERNAME	Hemant	Neha	Keshav																						
CUSTOMERNAME																											
Hemant																											
Neha																											
Keshav																											
	(1 Mark for correct output)																										
II.	SELECT CUSTOMERNAME, DISCOUNT FROM ORDERS WHERE DISCOUNT BETWEEN 5 AND 10;																										
Ans	<table><tr><th>CUSTOMERNAME</th><th>DISCOUNT</th></tr><tr><td>Hemant</td><td>10</td></tr><tr><td>Keshav</td><td>5</td></tr></table>	CUSTOMERNAME	DISCOUNT	Hemant	10	Keshav	5																				
CUSTOMERNAME	DISCOUNT																										
Hemant	10																										
Keshav	5																										
	(1 Mark for correct output)																										
III.	SELECT MONTHNAME (ORDERDATE) FROM ORDERS WHERE ORDERDATE IS NOT NULL;																										
Ans	<table><tr><th>MONTHNAME (ORDERDATE)</th></tr><tr><td>March</td></tr><tr><td>January</td></tr><tr><td>December</td></tr></table>	MONTHNAME (ORDERDATE)	March	January	December																						
MONTHNAME (ORDERDATE)																											
March																											
January																											
December																											
	(1 Mark for correct output)																										

IV.	SELECT ORDERID, DAY (ORDERDATE) FROM ORDERS ;																									
Ans	<table><tr><th>ORDERID</th><th>DAY (ORDERDATE)</th></tr><tr><td>101</td><td>1</td></tr><tr><td>102</td><td>NULL</td></tr><tr><td>103</td><td>20</td></tr><tr><td>104</td><td>25</td></tr></table>		ORDERID	DAY (ORDERDATE)	101	1	102	NULL	103	20	104	25														
ORDERID	DAY (ORDERDATE)																									
101	1																									
102	NULL																									
103	20																									
104	25																									
	(1 Mark for correct output)																									
	SECTION - E																									
35.	<p>My Solutions Pvt. Ltd. is a reputed software development and IT consulting firm. The company’s head office is located in Mysuru, and it has a regional office in Chennai. The Mysuru office comprises four departments: Human Resources, Research, Design and Technical Support.</p> <div><div><div>Mysuru Head Office</div><div><div>Human Resources</div><div>Research</div><div>Design</div><div>Technical</div></div></div><div><div>Chennai Regional</div></div></div> <p>The distances between these departments and between Mysuru and Chennai are as follows :</p> <table><tr><td>Human Resources to Research</td><td>55 metres</td></tr><tr><td>Human Resources to Design</td><td>75 metres</td></tr><tr><td>Human Resources to Technical Support</td><td>140 metres</td></tr><tr><td>Research to Design</td><td>40 metres</td></tr><tr><td>Research to Technical Support</td><td>80 metres</td></tr><tr><td>Design to Technical Support</td><td>60 metres</td></tr><tr><td>Mysuru Office to Chennai Office</td><td>350 kilometres</td></tr></table> <p>The number of computers in each department/office is as follows :</p> <table><tr><td>Human Resources</td><td>30</td></tr><tr><td>Research</td><td>80</td></tr><tr><td>Design</td><td>50</td></tr><tr><td>Technical Support</td><td>20</td></tr><tr><td>Chennai Office</td><td>35</td></tr></table> <p>As a network engineer, you have to propose solutions for various queries listed from I to V.</p>	Human Resources to Research	55 metres	Human Resources to Design	75 metres	Human Resources to Technical Support	140 metres	Research to Design	40 metres	Research to Technical Support	80 metres	Design to Technical Support	60 metres	Mysuru Office to Chennai Office	350 kilometres	Human Resources	30	Research	80	Design	50	Technical Support	20	Chennai Office	35	5
Human Resources to Research	55 metres																									
Human Resources to Design	75 metres																									
Human Resources to Technical Support	140 metres																									
Research to Design	40 metres																									
Research to Technical Support	80 metres																									
Design to Technical Support	60 metres																									
Mysuru Office to Chennai Office	350 kilometres																									
Human Resources	30																									
Research	80																									
Design	50																									
Technical Support	20																									
Chennai Office	35																									

	I. Identify the most suitable department to install the main server in the Mysuru office. Justify your answer with a valid reason.	
Ans	Research department. Justification: Research department has maximum number of computers.	
	(½ Mark for writing the correct department) (½ Mark for correct justification)	
	II. Create a cable layout design to establish Wired network connectivity between the departments in the Mysuru Office.	
Ans		
	(1 Mark for creating correct cable layout) Note: Any other valid cable layout design to be accepted	
	III. Suggest the appropriate network device to connect multiple computers within the Research department.	
Ans	Switch or Hub	
	(1 Mark for writing appropriate network device)	
	IV. What type of network (LAN, MAN, WAN) would best connect the Mysuru and Chennai office ?	
Ans	WAN	
	(1 Mark for writing correct type of network)	
	V. Which device should be used if the signal strength weakens while transmitting data between the Human Resources and Technical Support departments due to the long distance between them ?	
Ans	Repeater	
	(1 Mark for writing the correct device)	
36.	Consider the DataFrame <b>Scholarship</b> shown below :	3+
	<b>Name</b> <b>Course</b> <b>Amount</b>	1+
		1=

	0      Ananya                      B.Sc.                      62000 1      Karan                      B.Tech                      67000 2      Simran                      MCA                      64000 3      Rahul                      BCA                      70000 4      Priya                      BA                      69000 Answer the following questions :	5
	I. Write Python code to create and display the given DataFrame using the Dictionary of Series method.	
Ans	<pre>import pandas as pd # Creating Series for each column name = pd.Series(["Ananya", "Karan", "Simran", "Rahul", "Priya"]) course = pd.Series(["B.Sc.", "B.Tech", "MCA", "BCA", "BA"]) amount = pd.Series([62000, 67000, 64000, 70000, 69000]) # Creating DataFrame using Dictionary of Series data = {"Name": name, "Course": course, "Amount": amount } Scholarship = pd.DataFrame(data) # Display the DataFrame print(Scholarship)  OR  import pandas as pd # Creating Series for each column Name=["Ananya", "Karan", "Simran", "Rahul", "Priya"] Course=["B.Sc.", "B.Tech", "MCA", "BCA", "BA"] Amount=[62000, 67000, 64000, 70000, 69000] name = pd.Series(Name) course = pd.Series(Course) amount = pd.Series(Amount) # Creating DataFrame using Dictionary of Series data = {"Name": name, "Course": course, "Amount": amount} Scholarship = pd.DataFrame(data) # Display the DataFrame print(Scholarship)</pre>	
	<i>(½ Mark for import pandas as pd)</i> <i>(½ Mark each for creation of Series for columns - Name, Course and Amount)</i> <i>(½ Mark for creation of DataFrame using dictionary of Series)</i> <i>(½ Mark for displaying the DataFrame)</i>	
	II. Rename row indexes to ['a', 'b', 'c', 'd', 'e']	
Ans	<pre>Scholarship.index = ['a', 'b', 'c', 'd', 'e']  OR  Scholarship = Scholarship.set_axis(['a', 'b', 'c', 'd', 'e'], axis=0)  OR  Scholarship = Scholarship.rename(index={0: 'a', 1: 'b', 2: 'c', 3: 'd',4: 'e'})  OR</pre>	

	Any other valid method	
	(1 mark for correctly renaming the row indexes) OR (½ mark for writing <code>set_axis</code> , ½ mark for correct values ['a','b','c','d','e'] )	
	III. Write Python statement to remove the last row of the given DataFrame	
Ans	<code>Scholarship = Scholarship.drop(Scholarship.index[-1])</code> OR <code>Scholarship = Scholarship.iloc[:-1]</code> OR <code>Scholarship = Scholarship.drop('e')</code> OR <code>Scholarship = Scholarship.drop(4)</code> OR <code>Scholarship.drop(Scholarship.index[-1], inplace=True)</code> OR <code>Scholarship = Scholarship.drop(Scholarship.tail(1).index)</code>	
	(½ mark for writing <code>Scholarship.drop()/iloc[]</code> ) (½ mark for writing correct argument of <code>drop()/iloc[]</code> )	
37	(a) Write suitable SQL query for the following :	5
	I. To display only the date part from the date/time expression '2026-01-01 10:10:10'	
Ans	<code>SELECT DATE('2026-01-01 10:10:10');</code>	
	(½ Mark for <code>SELECT</code> ) (½ Mark for <code>DATE ()</code> with <i>datetime string</i> )	
	II. To convert all customer names from the <code>Cust_Name</code> column to lowercase in the <code>Customer</code> table.	
Ans	<code>SELECT LOWER(Cust_Name) FROM Customer;</code> OR <code>SELECT LCASE(Cust_Name) FROM Customer;</code>	
	(½ Mark for <code>SELECT</code> ) (½ Mark for <code>LOWER ()/LCASE()</code> )	
	III. To extract the first 4 characters from the <code>City_Name</code> column in <code>Location</code> table.	
Ans	<code>SELECT LEFT(City_Name,4) FROM Location;</code> OR <code>SELECT SUBSTR(City_Name,1,4) FROM Location;</code> OR <code>SELECT MID(City_Name,1,4) FROM Location;</code>	
	( ½ Mark for <code>SELECT</code> ) ( ½ Mark for correct SQL function <code>LEFT()</code> or <code>SUBSTR()</code> )	
	IV. To display the name of the city from the <code>CITY</code> column in <code>EVENT</code> table, after removing leading spaces.	
Ans	<code>SELECT LTRIM(CITY) FROM EVENT;</code>	
	( ½ Mark for <code>SELECT</code> ) ( ½ Mark for correct SQL function <code>LTRIM()</code> )	
	V. To find the average salary from <code>Salary</code> column in <code>Employees</code> table.	

Ans	<b>SELECT AVG(Salary) FROM Employees;</b> OR <b>SELECT SUM(Salary)/COUNT(Salary) FROM Employees;</b>	
	<i>( ½ Mark for SELECT )</i> <i>( ½ Mark for correct SQL function AVG() OR SUM()/COUNT() )</i>	
	<b>OR</b>	
	(b) Write suitable SQL query for the following :	
	I. To display the value of 17 <sup>2</sup> .	
Ans	<b>SELECT POW(17,2) ;</b> OR <b>SELECT POWER(17, 2) ;</b>	
	<i>( ½ Mark for SELECT )</i> <i>( ½ Mark for correct SQL function POW()/ POWER() )</i>	
	II. To display the day part of the dates in the Hire_Date column of the Employee table.	
Ans	<b>SELECT DAY(Hire_Date)FROM Employee;</b>	
	<i>( ½ Mark for SELECT )</i> <i>( ½ Mark for correct SQL function DAY() )</i> <b>Note : DAYOFMONTH() also to be accepted</b>	
	III. To display the maximum value of the Bill_Amount column in the Bill table.	
Ans	<b>SELECT MAX(Bill_Amount) FROM Bill;</b>	
	<i>( ½ Mark for SELECT )</i> <i>( ½ Mark for correct SQL function MAX() )</i>	
	IV. To remove leading and trailing spaces from the Location column in the Branch table.	
Ans	<b>UPDATE Branch SET Location = TRIM(Location) ;</b> OR <b>SELECT TRIM(Location) FROM Branch;</b>	
	<i>( ½ Mark for UPDATE/SELECT )</i> <i>( ½ Mark for correct SQL function TRIM() )</i>	
	V. To display total salary from tot_sal column in Employees table.	
Ans	<b>SELECT SUM(tot_sal) FROM Employees;</b>	
	<i>( ½ Mark for SELECT )</i> <i>( ½ Mark for correct SQL function SUM() )</i>  <b>Note:</b> <b>SELECT tot_sal FROM Employees; to be accepted</b> <i>( ½ Mark for SELECT )</i> <i>( ½ Mark for correct column )</i>	