

Marking Scheme (English Version)

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Senior Secondary School Examination 2026 (Supplementary)

SUBJECT NAME: INFORMATICS PRACTICES SUBJECT CODE: 065 (Set 4 Q.P. CODE 90/7)

General Instructions:

1	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.
2	“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 Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”
3	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.
4	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.
5	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.
6	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. This is the most common mistake which evaluators are committing.
7	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.
8	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.

9	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”.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 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	• 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.
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	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.
16	The Examiners should acquaint themselves with the guidelines given in the “ Guidelines for Spot Evaluation ” before starting the actual evaluation.
17	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.
18	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.

MARKING SCHEME

INFORMATICS PRACTICES 065

Max. Marks: 70

General Instructions :

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

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 : We need to import the Pandas library to use its data structures.	1
Ans	True	
	<i>(1 mark for writing the correct answer)</i>	
2.	In the relational model, _____ are called relations, which store data in rows and columns. (A) ATTRIBUTES (B) TABLES (C) TUPLES (D) DATABASE	1
Ans	(B) TABLES	
	<i>(1 Mark for writing the correct option)</i>	
3.	Excessive usage of digital devices has a/an _____ impact on our physical as well as psychological well-being. (A) Excellent (B) Positive (C) Awesome (D) Negative	1
Ans	(D) Negative	
	<i>(1 Mark for writing the correct option)</i>	
4.	Anjali is working on a Pandas DataFrame containing 3 rows. She wants to delete a specific row using the <code>drop()</code> function. What value should she assign to the axis parameter to do this ? (A) 0 (B) 1 (C) 2 (D) 3	1
Ans	(A) 0	
	<i>(1 Mark for writing the correct option)</i>	

5.	Which of the following networking devices regenerates a weak signal and retransmits it through the cable ? (A) Repeater (B) Hub (C) Modem (D) Gateway	1
Ans	(A) Repeater	
	<i>(1 Mark for writing the correct option)</i>	
6.	State whether the following statement is True or False : In Pandas, slicing a Series cannot be done using labelled indexes.	1
Ans	False	
	<i>(1 Mark for writing the correct answer)</i>	
7.	Sanjana has composed an original piece of music and wants to ensure that her ownership is recognized and protected. Which type of intellectual property right should she seek ? (A) Trademark (B) Both Copyright and Trademark (C) Copyright (D) Patent	1
Ans	(C) Copyright	
	<i>(1 Mark for writing the correct option)</i>	
8.	Aryan is working on a Pandas Series named <code>ser</code> . He has written the code : <code>print(ser[::-1])</code> This code will print _____. (A) Alternate elements (B) All elements (C) Last one element (D) All elements in reverse order	1
Ans	(D) All elements in reverse order	
	<i>(1 Mark for writing the correct option)</i>	

9.	What does the following SQL command count ? SELECT COUNT(*) FROM Employee; (A) Only non-null values in the table (B) Only numeric values in the table (C) All rows present in the table (D) Only non-numeric values in the table	1
Ans	(C) All rows present in the table	
	(1 Mark for writing the correct option)	
10.	What is a website ? (A) A single HTML file only (B) A collection of related web pages (C) A type of software (D) A search engine	1
Ans	(B) A collection of related web pages	
	(1 Mark for writing the correct option)	
11.	SQL statements are : (A) Case-sensitive (B) Case-insensitive (C) Numeric only (D) Graphical commands	1
Ans	(B) Case-insensitive	
	(1 Mark for writing the correct option)	
12.	While plotting a histogram in Python, the _____ of each column (bar) in the histogram is proportional to the number of data points contained in that bin. (A) Length (B) Width (C) Height (D) Volume	1
Ans	(C) Height	
	(1 Mark for writing the correct option)	

13.	Which of the following is a major hazard of e-waste ? (A) Better e-waste management (B) Air pollution due to vehicles (C) Harmful chemicals seeping into soil and water (D) Data theft from social media accounts	1
Ans	(C) Harmful chemicals seeping into the soil and water	
	(1 Mark for writing the correct option)	
14.	Which of the following is not a valid data type of SQL ? (A) <code>char</code> (B) <code>varchar</code> (C) <code>string</code> (D) <code>int</code>	1
Ans	(C) <code>string</code>	
	(1 Mark for writing the correct option)	
15.	Maria is working on a DataFrame named ' <code>df</code> ' and wants to display the last 3 rows of it. Which of the following Python commands should she use ? (A) <code>df.last(3)</code> (B) <code>df.tail(3)</code> (C) <code>df.end(3)</code> (D) <code>df.bottom(3)</code>	1
Ans	(B) <code>df.tail(3)</code>	
	(1 Mark for the correct answer)	
16.	Himanshi works in a company that has branches in many different cities and all are connected via network. Which type of network is this ? (A) LAN (B) MAN (C) WAN (D) PAN	1
Ans	(C) WAN	
	(1 Mark for the correct answer)	
17.	State whether the following statement is True or False : In Python, Pandas is a high-level data manipulation tool used for analysing data.	1
Ans	True	
	(1 Mark for the correct answer)	

18.	In Pandas, what does the term NaN represent ? (A) Not a Name (B) Nd-array Name (C) New array Number (D) Not a Number	1
Ans	(D) Not a Number	
	(1 Mark for the correct answer)	
19.	Which of the following is not a valid Data Definition Language (DDL) command in SQL ? (A) CREATE (B) DROP (C) ALTER (D) INSERT	1
Ans	(D) INSERT	
	(1 Mark for the correct answer)	
	Questions 20 and 21 are Assertion (A) and Reason (R) type questions. Choose the correct option as : (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not 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) : While creating a Series from scalar values in Pandas, if the index is not specified, default index starts from 0. Reason (R) : In a Pandas Series, default indices range from 0 to N-1, where N is the number of data values.	1
Ans	(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A). Note: Option (A) - Both Assertion (A) and Reason (R) are True and Reason (R) is the correct explanation for Assertion (A) to be accepted as correct answer	

	(1 Mark for writing the correct option)	
21.	Assertion (A) : The output of the SQL query <code>SELECT INSTR('Information', 'o') ;</code> will be 10. Reason (R) : In SQL, the <code>INSTR(string, substring)</code> function returns the position of the first occurrence of the specified substring within the given string.	1
Ans	(D) Assertion (A) is False, but Reason (R) is True.	
	(1 Mark for writing the correct option)	
SECTION - B		
22.	(a) List any two properties of a Pandas DataFrame.	2
Ans	Properties of Pandas Dataframe: shape, columns, index, size, ndim, dtypes, values, T, axes. Any 2 correct properties to be accepted. Note: The following or any two valid characteristics also to be accepted. • A DataFrame is a two-dimensional data structure consisting of rows and columns, similar to a table. • Each column in a DataFrame can have different data types such as numeric, string, or boolean.	
	(1 Mark each for writing any two correct properties/ characteristics)	
	OR (b) Mention any two main purposes of plotting data.	
Ans	The two main purposes of plotting data are : • To identify patterns or trends. • To compare data • To understand trends • To show relationships between variables.	
	(1 Mark each for writing any two correct purposes)	
23.	Who are unethical hackers ? What is their main objective ?	2
Ans	An unethical hacker is the one who tries to gain unauthorised access into computers or networks mostly with malicious intent. Their primary focus is personal benefits /to steal/damage/misuse/destroy data/ disrupt computer systems/gain financially.	
	(1 Mark for defining unethical hacker and 1 mark for any one correct objective)	

24.	What is a DBMS ? Briefly discuss its purpose.	2
Ans	A database management system (DBMS) is a software that is used to create and manage databases. Purpose of DBMS: • To store data in an organized manner. • To provide easy access to data. • To ensure data security. • To reduce data redundancy. • To maintain data accuracy and consistency.	
	(1 Mark for writing the correct definition of DBMS and 1 Mark for any one correct purpose .) Note: ½ mark to be awarded if only the expansion of DBMS is correctly written.	
25.	(a) Riya, a class 12 student, is new to the topic 'Internet'. Help her enhance her understanding of the topic by mentioning any four applications or services of the Internet.	2
Ans	(a) Areas or services provided through Internet : • The World Wide Web (WWW) • Electronic mail (Email) • Chat • Video Conferencing • E-commerce	
	(½ Mark each for any four correct applications)	
	OR (b) What is the function of a web browser ? Name any two web browsers.	
Ans	A web browser is used to access and view webpages/ websites. Examples of web browsers: Google Chrome, Edge, Safari and Mozilla Firefox. Note: Only names of the browsers without the name of the company names to be accepted.	
	(1 Mark for the correct function of the web browser. ½ mark each for mentioning any two correct web browsers.)	
26.	Write SQL queries to perform the following : (i) To display the remainder when 25 is divided by 4. (ii) To display the length of the string 'Informatics Practices' .	2
Ans	(i) SELECT MOD (25,4) ; (ii) SELECT LENGTH('Informatics Practices') ;	

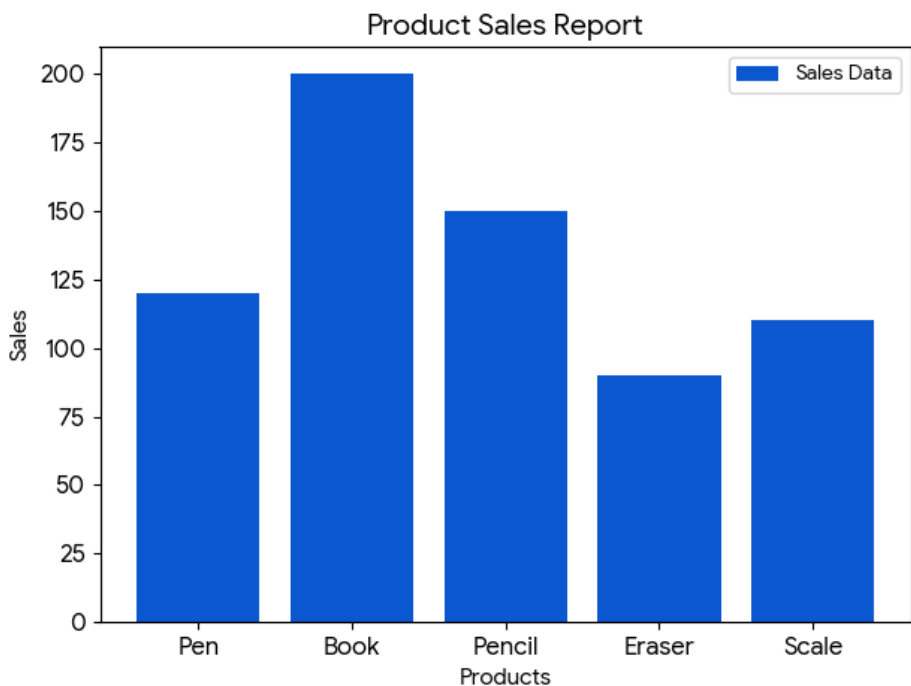
	(i) (½ mark for writing <i>SELECT</i> , ½ mark for <i>MOD(25, 4)</i>) (ii) (½ mark for writing <i>SELECT</i> , ½ mark for <i>LENGTH('Informatics Practices')</i>)													
27.	Mention any two general preventive measures to reduce eye strain while using computers or mobile devices.	2												
Ans	1. Maintain the correct viewing distance 2. Maintain the correct screen angle 3. Take regular breaks 4. Blink eyes frequently 5. Adjust brightness and contrast of display screen (Any other relevant preventive measures also be accepted.)													
	(1 Mark each for writing any two correct preventive measures)													
28.	(a) Write the output of the following code : <pre>import pandas as pd data = [{'Product': 'Pen', 'Price': 5, 'Discount': 1}, {'Product': 'Pencil', 'Price': 3, 'Discount': 0.5}] df = pd.DataFrame(data) print(df)</pre>	2												
Ans	(a) <table><tr><td></td><td>Product</td><td>Price</td><td>Discount</td></tr><tr><td>0</td><td>Pen</td><td>5</td><td>1.0</td></tr><tr><td>1</td><td>Pencil</td><td>3</td><td>0.5</td></tr></table>		Product	Price	Discount	0	Pen	5	1.0	1	Pencil	3	0.5	
	Product	Price	Discount											
0	Pen	5	1.0											
1	Pencil	3	0.5											
	(½ Mark for each correct column of output)													
	OR (b) Write the output of the following code : <pre>import pandas as pd s1 = pd.Series([1, 2, 3], index=['a', 'b', 'c']) s2 = pd.Series([4, 5, 6], index=['b', 'c', 'd']) print(s1 * s2)</pre>													
Ans	(b) <table><tr><td>a</td><td>NaN</td></tr><tr><td>b</td><td>8.0</td></tr><tr><td>c</td><td>15.0</td></tr><tr><td>d</td><td>NaN</td></tr></table>	a	NaN	b	8.0	c	15.0	d	NaN					
a	NaN													
b	8.0													
c	15.0													
d	NaN													
	(½ Mark for writing each correct row of output) Note: 8, 15 to be accepted in place of 8.0, 15.0													
SECTION - C														
29.	Preeti is active on various social media platforms and often shares personal pictures and updates about her daily routine. But she has no knowledge about how to keep her account secure. Help her by answering the following questions :	3												

	(i) What type of digital footprint is Preeti creating ?							
Ans	(i) Preeti is creating an active digital footprint.							
	(1 Mark for the correct answer)							
	(ii) What are the risks associated with such online behaviour ?							
Ans	(ii) Risks associated with such online behaviour: ● Identity theft ● Privacy loss ● Cyberstalking ● Account hacking ● Fraud and phishing attacks ● Physical security risks							
	(½ Mark each for mentioning Any two correct risks)							
	(iii) Suggest her any two general ways to protect her digital footprint.							
Ans	(iii) She can protect her digital footprint by : ● Avoiding sharing personal information ● Using strong privacy settings ● Thinking carefully before sharing personal content online ● Using strong passwords ● Enabling two-factor authentication (2FA)							
	(½ Mark each for any two correct ways)							
30.	Write a Python program that creates a Pandas Series from a dictionary, where the subjects 'Physics', 'Maths', and 'Chemistry' are keys, and their respective marks 85, 90, and 65 are values. The program should also display the Series. <table><tr><td>Physics</td><td>85</td></tr><tr><td>Maths</td><td>90</td></tr><tr><td>Chemistry</td><td>65</td></tr></table>	Physics	85	Maths	90	Chemistry	65	3
Physics	85							
Maths	90							
Chemistry	65							
Ans	<pre>import pandas as pd data = {'Physics': 85, 'Maths' : 90, 'Chemistry' : 65} sr = pd.Series(data) print(sr)</pre>							
	(½ Mark for correct import statement) (1 Mark for creating the dictionary with correct key-value pairs) (1 Mark for creating series from dictionary) (½ Mark for correct print statement)							

	OR Write a Python program to create a NumPy array containing the names of five fruits. Convert it into a Pandas Series with custom indices ['A', 'B', 'C', 'D', 'E'] .	3															
Ans	<pre>import numpy as np import pandas as pd # Create a NumPy array of fruit names fruits = np.array(['Apple', 'Banana', 'Mango', 'Orange', 'Grapes']) # Convert the NumPy array into a Pandas Series with custom indices s = pd.Series(fruits, index=['A', 'B', 'C', 'D', 'E'])</pre>																
	(½ Mark each for both import statements) (1 Mark for creating the numpy array) (1 Mark for converting numpy array into series with custom indices) Note: ignore print(s) if written at the end of code for displaying the series.																
31.	(a) (i) Write an SQL statement to create a table named LIBRARY, with the following specifications : <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>BookID</td><td>INT</td><td>Primary Key</td></tr> <tr> <td>Title</td><td>VARCHAR(50)</td><td></td></tr> <tr> <td>Author</td><td>VARCHAR(30)</td><td></td></tr> <tr> <td>Price</td><td>FLOAT(6,2)</td><td></td></tr> </tbody> </table>	Column Name	Data Type	Key	BookID	INT	Primary Key	Title	VARCHAR(50)		Author	VARCHAR(30)		Price	FLOAT(6,2)		3
Column Name	Data Type	Key															
BookID	INT	Primary Key															
Title	VARCHAR(50)																
Author	VARCHAR(30)																
Price	FLOAT(6,2)																
Ans	<pre>CREATE TABLE LIBRARY (BookID INT PRIMARY KEY, Title VARCHAR(50), Author VARCHAR(30), Price FLOAT(6,2));</pre>																
	(½ Mark for CREATE TABLE LIBRARY) (½ Mark for correct attributes and datatypes) (½ Mark for Primary Key) Note: Data type decimal to be accepted in place of float																
	(ii) Write an SQL query to delete the record where the BookID is 102.																
Ans	<pre>DELETE FROM LIBRARY WHERE BookID = 102;</pre>																
	(½ Mark for writing DELETE)																

	(½ Mark for FROM LIBRARY) (½ Mark for WHERE BookID = 102)																					
	OR (b) Consider the table ADMISSION as given below. <table><tr><th>AdmNo</th><th>Name</th><th>Phone</th><th>City</th></tr><tr><td>101</td><td>Ritesh</td><td>9876543210</td><td>Delhi</td></tr><tr><td>102</td><td>Priya</td><td>NULL</td><td>Mumbai</td></tr><tr><td>103</td><td>Aarav</td><td>7654321890</td><td>Mumbai</td></tr><tr><td>104</td><td>Ritesh</td><td>NULL</td><td>Chennai</td></tr></table>	AdmNo	Name	Phone	City	101	Ritesh	9876543210	Delhi	102	Priya	NULL	Mumbai	103	Aarav	7654321890	Mumbai	104	Ritesh	NULL	Chennai	
AdmNo	Name	Phone	City																			
101	Ritesh	9876543210	Delhi																			
102	Priya	NULL	Mumbai																			
103	Aarav	7654321890	Mumbai																			
104	Ritesh	NULL	Chennai																			
	(i) Which attribute of the given table can be considered as the Primary Key ? Give reason.																					
Ans	The attribute AdmNo can be considered as the Primary Key because it uniquely identifies each row in the table.																					
	(½ Mark for the correct identification and ½ mark for mentioning the correct reason)																					
	(ii) Write an SQL query to add a column emailid of type VARCHAR with size 30 in the above given table.																					
Ans	ALTER TABLE ADMISSION ADD emailid VARCHAR(30); OR ALTER TABLE ADMISSION ADD COLUMN emailid VARCHAR(30);																					
	(½ Mark for ALTER TABLE ADMISSION) (½ Mark for ADD emailid VARCHAR(30) / ADD COLUMN emailid VARCHAR(30))																					
	(iii) Write an SQL query to display records where the Phone number is not available.																					
Ans	SELECT * FROM ADMISSION WHERE Phone IS NULL;																					
	(½ Mark for SELECT * FROM ADMISSION) (½ Mark for WHERE Phone IS NULL)																					

32.	Consider the following tables : Table 1 : FLIGHT <table><tr><th>FlightNo</th><th>FromCity</th><th>ToCity</th><th>DepTime</th></tr><tr><td>AI101</td><td>Delhi</td><td>Mumbai</td><td>08:00 AM</td></tr><tr><td>AI102</td><td>Delhi</td><td>Bengaluru</td><td>10:00 AM</td></tr><tr><td>AI103</td><td>Mumbai</td><td>Chennai</td><td>01:00 PM</td></tr><tr><td>AI104</td><td>Delhi</td><td>Chennai</td><td>06:00 PM</td></tr></table> Table 2 : FARE <table><tr><th>FlightNo</th><th>Class</th><th>Fare</th></tr><tr><td>AI101</td><td>Economy</td><td>5000</td></tr><tr><td>AI102</td><td>Executive</td><td>9500</td></tr><tr><td>AI103</td><td>Economy</td><td>5500</td></tr><tr><td>AI104</td><td>Executive</td><td>10000</td></tr></table> Write an appropriate SQL query for the following :	FlightNo	FromCity	ToCity	DepTime	AI101	Delhi	Mumbai	08:00 AM	AI102	Delhi	Bengaluru	10:00 AM	AI103	Mumbai	Chennai	01:00 PM	AI104	Delhi	Chennai	06:00 PM	FlightNo	Class	Fare	AI101	Economy	5000	AI102	Executive	9500	AI103	Economy	5500	AI104	Executive	10000	3
FlightNo	FromCity	ToCity	DepTime																																		
AI101	Delhi	Mumbai	08:00 AM																																		
AI102	Delhi	Bengaluru	10:00 AM																																		
AI103	Mumbai	Chennai	01:00 PM																																		
AI104	Delhi	Chennai	06:00 PM																																		
FlightNo	Class	Fare																																			
AI101	Economy	5000																																			
AI102	Executive	9500																																			
AI103	Economy	5500																																			
AI104	Executive	10000																																			
	(i) Display the departure time of the flight from Delhi to Mumbai.																																				
Ans	SELECT DepTime FROM FLIGHT WHERE FromCity='Delhi' and ToCity='Mumbai';																																				
	(½ Mark for SELECT DepTime FROM FLIGHT) (½ Mark for WHERE FromCity='Delhi' and ToCity='Mumbai')																																				
	(ii) Display all flight details from the FLIGHT table along with the corresponding fare.																																				
Ans	SELECT Flight.FlightNo, FromCity, ToCity, DepTime, Fare FROM Flight, Fare WHERE FLIGHT.FlightNo=FARE.FlightNo; OR SELECT FlightNo, FromCity, ToCity, DepTime, Fare FROM FLIGHT NATURAL JOIN FARE;																																				
	(½ Mark for SELECT Flight.FlightNo, FromCity, ToCity, DepTime, Fare) (½ Mark for FROM Flight, Fare WHERE Flight.FlightNo=Fare.FlightNo) OR (½ Mark for SELECT Flight.FlightNo, FromCity, ToCity, DepTime, Fare) (½ Mark for FROM Flight NATURAL JOIN Fare)																																				
	(iii) Display the class available in flights scheduled for Mumbai.																																				

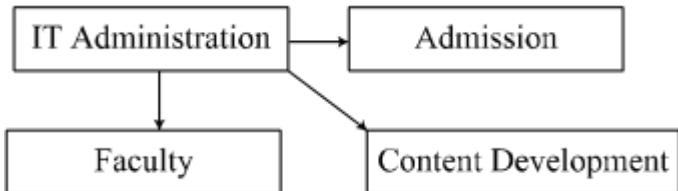
Ans	<pre>SELECT Class FROM FLIGHT, FARE WHERE Flight.FlightNo=FARE.FlightNo and ToCity='Mumbai'; OR SELECT Class FROM FLIGHT NATURAL JOIN FARE WHERE ToCity='Mumbai';</pre>													
	(½ Mark for SELECT Class FROM FLIGHT, FARE) (½ Mark WHERE FLIGHT.FlightNo=FARE.FlightNo and ToCity='Mumbai') OR (½ Mark for SELECT Class FROM FLIGHT NATURAL JOIN FARE) (½ Mark WHERE ToCity='Mumbai')													
SECTION - D														
33.	A data analyst wants to compare the sales of 5 products through a bar chart based on the following sales data : <table><tr><th>Product</th><th>Sales</th></tr><tr><td>Pen</td><td>120</td></tr><tr><td>Book</td><td>200</td></tr><tr><td>Pencil</td><td>150</td></tr><tr><td>Eraser</td><td>90</td></tr><tr><td>Scale</td><td>110</td></tr></table> He has started writing the Python code for it, but it is not complete. Help him by filling in the blanks in the given Python program so that the bar graph as shown below is displayed. 	Product	Sales	Pen	120	Book	200	Pencil	150	Eraser	90	Scale	110	4
Product	Sales													
Pen	120													
Book	200													
Pencil	150													
Eraser	90													
Scale	110													

	<pre> import matplotlib.pyplot as plt Products = [_____] # Statement-1 Sales = [120, 200, 150, 90, 110] plt.bar(_____, Sales, label='Sales Data') # Statement-2 plt.xlabel('Products') plt.ylabel('Sales') plt.legend() plt._____('Product Sales Report') # Statement-3 plt._____('sales.png') # Statement-4 plt.show() </pre>	
(i)	Refer to the graph shown above and fill in the blank in Statement-1 with suitable Python code.	
Ans	'Pen', 'Book', 'Pencil', 'Eraser', 'Scale'	
	<i>(1 Mark for correct answer)</i>	
(ii)	Write the suitable code for the blank space in the line marked as Statement-2, which plots the bar graph with the appropriate data.	
Ans	Products	
	<i>(1 Mark for correct answer)</i>	
(iii)	Fill in the blank in Statement-3 with the correct Python code to set the title of the graph.	
Ans	title	
	<i>(1 Mark for correct answer)</i>	
(iv)	Fill in the blank in Statement-4 with the appropriate Python code to save the graph as an image file named 'sales.png'.	
Ans	savefig	
	<i>(1 Mark for correct answer)</i>	

34.	Aparna, who works as a computer operator at a school, has created a table named Teachers to keep track of teacher details, as shown below : Table : Teachers <table><tr><th>TeacherID</th><th>Name</th><th>Subject</th><th>JoiningDate</th><th>Salary</th></tr><tr><td>T01</td><td>Anjali</td><td>Accountancy</td><td>2020-04-01</td><td>45000</td></tr><tr><td>T02</td><td>Dheeraj</td><td>English</td><td>2021-06-15</td><td>47000</td></tr><tr><td>T03</td><td>Namrata</td><td>Economics</td><td>2019-09-25</td><td>50000</td></tr><tr><td>T04</td><td>Harsh</td><td>English</td><td>2021-01-10</td><td>46000</td></tr><tr><td>T05</td><td>John</td><td>Economics</td><td>2025-02-15</td><td>85000</td></tr></table> Write suitable SQL queries for the following :	TeacherID	Name	Subject	JoiningDate	Salary	T01	Anjali	Accountancy	2020-04-01	45000	T02	Dheeraj	English	2021-06-15	47000	T03	Namrata	Economics	2019-09-25	50000	T04	Harsh	English	2021-01-10	46000	T05	John	Economics	2025-02-15	85000	4
TeacherID	Name	Subject	JoiningDate	Salary																												
T01	Anjali	Accountancy	2020-04-01	45000																												
T02	Dheeraj	English	2021-06-15	47000																												
T03	Namrata	Economics	2019-09-25	50000																												
T04	Harsh	English	2021-01-10	46000																												
T05	John	Economics	2025-02-15	85000																												
(i)	Display the teacher’s ID and the corresponding joining date’s day name.																															
Ans	SELECT TeacherID, DAYNAME(JoiningDate) FROM Teachers;																															
	<i>(½ Mark for SELECT TeacherID, DAYNAME(JoiningDate))</i> <i>(½ Mark for FROM Teachers)</i>																															
(ii)	Display the teacher’s name after removing leading and trailing spaces.																															
Ans	SELECT TRIM(Name) FROM Teachers;																															
	<i>(½ Mark for SELECT TRIM(Name))</i> <i>(½ Mark for FROM Teachers)</i>																															
(iii)	Show the average salary of teachers.																															
Ans	SELECT AVG(Salary) FROM Teachers;																															
	<i>(½ Mark for SELECT AVG(Salary))</i> <i>(½ Mark for FROM Teachers)</i>																															
(iv)	Display subject-wise lowest salaries.																															
Ans	SELECT Subject, MIN(Salary) FROM Teachers GROUP BY Subject;																															
	<i>(½ Mark for SELECT Subject, MIN(Salary) FROM Teachers)</i> <i>(½ Mark for GROUP BY Subject)</i>																															
	OR (b) Consider the following table and write the output of the following SQL Queries :																															

	Table : PRODUCTS <table><tr><th>PRODUCTID</th><th>PRODUCTNAME</th><th>PRICE</th><th>STOCK</th><th>MFGDATE</th></tr><tr><td>P01</td><td>Laptop</td><td>60000</td><td>10</td><td>2023-02-10</td></tr><tr><td>P02</td><td>Mouse</td><td>300</td><td>100</td><td>2022-11-12</td></tr><tr><td>P03</td><td>Keyboard</td><td>500</td><td>50</td><td>2022-10-05</td></tr><tr><td>P04</td><td>Monitor</td><td>5000</td><td>0</td><td>2023-04-01</td></tr></table> Write the output of the following SQL Queries :	PRODUCTID	PRODUCTNAME	PRICE	STOCK	MFGDATE	P01	Laptop	60000	10	2023-02-10	P02	Mouse	300	100	2022-11-12	P03	Keyboard	500	50	2022-10-05	P04	Monitor	5000	0	2023-04-01	
PRODUCTID	PRODUCTNAME	PRICE	STOCK	MFGDATE																							
P01	Laptop	60000	10	2023-02-10																							
P02	Mouse	300	100	2022-11-12																							
P03	Keyboard	500	50	2022-10-05																							
P04	Monitor	5000	0	2023-04-01																							
(i)	SELECT PRODUCTID FROM PRODUCTS WHERE STOCK = 0;																										
Ans	<table><tr><th>PRODUCTID</th></tr><tr><td>P04</td></tr></table>	PRODUCTID	P04																								
PRODUCTID																											
P04																											
	(1 Mark for correct output)																										
(ii)	SELECT PRODUCTNAME, MONTH(MFGDATE) FROM PRODUCTS;																										
Ans	<table><tr><th>PRODUCTNAME</th><th>MONTH(MFGDATE)</th></tr><tr><td>Laptop</td><td>2</td></tr><tr><td>Mouse</td><td>11</td></tr><tr><td>Keyboard</td><td>10</td></tr><tr><td>Monitor</td><td>4</td></tr></table>	PRODUCTNAME	MONTH(MFGDATE)	Laptop	2	Mouse	11	Keyboard	10	Monitor	4																
PRODUCTNAME	MONTH(MFGDATE)																										
Laptop	2																										
Mouse	11																										
Keyboard	10																										
Monitor	4																										
	(1 Mark for correct output)																										
(iii)	SELECT PRODUCTNAME FROM PRODUCTS ORDER BY PRICE;																										
Ans	<table><tr><th>PRODUCTNAME</th></tr><tr><td>Mouse</td></tr><tr><td>Keyboard</td></tr><tr><td>Monitor</td></tr><tr><td>Laptop</td></tr></table>	PRODUCTNAME	Mouse	Keyboard	Monitor	Laptop																					
PRODUCTNAME																											
Mouse																											
Keyboard																											
Monitor																											
Laptop																											
	(1 Mark for correct output)																										
(iv)	SELECT MAX(Stock) FROM PRODUCTS;																										

Ans	<table><tr><td>MAX (Stock)</td></tr><tr><td>100</td></tr></table>	MAX (Stock)	100																							
MAX (Stock)																										
100																										
	(1 Mark for correct output)																									
	SECTION - E																									
35.	ABC Training Pvt. Ltd. is an educational training company. The company’s main office is in Hyderabad, and it has a training centre in Visakhapatnam. The Hyderabad office has four departments : Admissions, Faculty, Content Development, and IT Administration. Hyderabad Head Office Admissions Faculty Content Development IT Administration Visakhapatnam Training Centre The distances between departments and between offices are as follows : <table><tr><td>Admissions to Faculty</td><td>50 metres</td></tr><tr><td>Admissions to Content Development</td><td>85 metres</td></tr><tr><td>Admissions to IT Administration</td><td>130 metres</td></tr><tr><td>Faculty to Content Development</td><td>60 metres</td></tr><tr><td>Faculty to IT Administration</td><td>90 metres</td></tr><tr><td>Content Development to IT Administration</td><td>70 metres</td></tr><tr><td>Hyderabad Office to Visakhapatnam Centre</td><td>620 kilometres</td></tr></table> The number of computers in each department/office is : <table><tr><td>Admissions</td><td>35</td></tr><tr><td>Faculty</td><td>20</td></tr><tr><td>Content Development</td><td>55</td></tr><tr><td>IT Administration</td><td>97</td></tr><tr><td>Visakhapatnam Centre</td><td>40</td></tr></table> Based on the above case study, answer the following questions :	Admissions to Faculty	50 metres	Admissions to Content Development	85 metres	Admissions to IT Administration	130 metres	Faculty to Content Development	60 metres	Faculty to IT Administration	90 metres	Content Development to IT Administration	70 metres	Hyderabad Office to Visakhapatnam Centre	620 kilometres	Admissions	35	Faculty	20	Content Development	55	IT Administration	97	Visakhapatnam Centre	40	5
Admissions to Faculty	50 metres																									
Admissions to Content Development	85 metres																									
Admissions to IT Administration	130 metres																									
Faculty to Content Development	60 metres																									
Faculty to IT Administration	90 metres																									
Content Development to IT Administration	70 metres																									
Hyderabad Office to Visakhapatnam Centre	620 kilometres																									
Admissions	35																									
Faculty	20																									
Content Development	55																									
IT Administration	97																									
Visakhapatnam Centre	40																									
	(i) Identify the most suitable department to install the main server in the Hyderabad office. Justify your answer with a valid reason.																									

Ans	The server should be placed in the IT Administration department because it has the highest number of computers.					
	(½ Mark for writing the correct department) (½ Mark for correct justification)					
	(ii) Propose a cable layout diagram (topology) to connect all the departments at the Hyderabad office for fast data transfer.					
Ans						
	(1 Mark for creating correct cable layout) Note: Any other valid cable layout design to be accepted					
	(iii) Mention any one point of difference between the networking devices, the hub and the switch, to decide which device to use out of two.					
Ans	<table border="1"><thead><tr><th>Hub</th><th>Switch</th></tr></thead><tbody><tr><td>A hub is a device which sends data to all connected devices.</td><td>A switch is a smart device which sends data only to the intended device.</td></tr></tbody></table>	Hub	Switch	A hub is a device which sends data to all connected devices.	A switch is a smart device which sends data only to the intended device.	
Hub	Switch					
A hub is a device which sends data to all connected devices.	A switch is a smart device which sends data only to the intended device.					
	(1 Mark for writing the correct difference)					
	(iv) Identify the place(s) where the switch should be placed in the Hyderabad office. Justify your answer with a valid reason.					
Ans	Switch should be placed in each department, as it is used to interconnect all the devices in the department.					
	(½ Mark for writing the correct placement) (½ Mark for correct justification)					
	(v) The Company also provides online training through its website. To access the training, users must log in to the company's web portal using the URL provided to them. Expand and define the term URL.					
Ans	URL stands for Uniform Resource Locator. It is the address of a resource or webpage on the Internet.					
	(½ Mark for expansion of URL)					

	(½ Mark for correct definition)																									
36.	Consider the DataFrame df shown below : <table><tr><td></td><td>City</td><td>Temp</td><td>AQI</td></tr><tr><td>0</td><td>Delhi</td><td>40</td><td>97</td></tr><tr><td>1</td><td>Mumbai</td><td>34</td><td>76</td></tr><tr><td>2</td><td>Kolkata</td><td>38</td><td>60</td></tr><tr><td>3</td><td>Chennai</td><td>36</td><td>90</td></tr><tr><td>4</td><td>Bengaluru</td><td>30</td><td>55</td></tr></table> Write Python statements for the following tasks :		City	Temp	AQI	0	Delhi	40	97	1	Mumbai	34	76	2	Kolkata	38	60	3	Chennai	36	90	4	Bengaluru	30	55	5
	City	Temp	AQI																							
0	Delhi	40	97																							
1	Mumbai	34	76																							
2	Kolkata	38	60																							
3	Chennai	36	90																							
4	Bengaluru	30	55																							
	(i) To transfer the data from the DataFrame df to a CSV file named temp.csv for future use.																									
Ans	<code>df.to_csv('temp.csv')</code>																									
	(½ Mark for <code>df.to_csv()</code>) (½ Mark for correct parameter 'temp.csv')																									
	(ii) To add column 'Humidity' with values [20, 40, 35, 45, 50].																									
Ans	<code>df['Humidity'] = [20, 40, 35, 45, 50]</code> OR <code>df.loc[:, 'Humidity'] = [20, 40, 35, 45, 50]</code>																									
	(½ Mark for <code>df['Humidity'] =</code>) (½ Mark for <code>[20, 40, 35, 45, 50]</code>) OR (½ Mark for <code>df.loc[:, 'Humidity'] =</code>) (½ Mark for <code>[20, 40, 35, 45, 50]</code>)																									
	(iii) To display all the city names along with their corresponding temperatures.																									
Ans	<code>print(df[['City', 'Temp']])</code>																									
	(½ mark for writing <code>print(df[[]])</code>) 7 (½ mark for writing <code>['City', 'Temp']</code>)																									
	(iv) To delete 'AQI' column from the DataFrame.																									
Ans	<code>df=df.drop('AQI', axis=1)</code>																									

	OR del df['AQI']	
	(½ mark for writing df=df.drop()) (½ mark for writing correct parameters 'AQI', axis=1) OR (½ mark for writing del) (½ mark for df['AQI'])	
	(v) To rename 'Temp' column to 'Temperature'.	
Ans	df=df.rename ({'Temp': 'Temperature'}, axis='columns')	
	(½ mark for writing df=df.rename ()) (½ mark for writing correct parameters {'Temp': 'Temperature'}, axis='columns')	
37	(a) Write suitable SQL queries for the following :	5
	(i) To raise the value in the Base_Num column to the power of value in the Exp_Num column from the table named PowerTable.	
Ans	SELECT POW(Base_Num, Exp_Num) FROM PowerTable; OR SELECT POWER(Base_Num, Exp_Num) FROM PowerTable;	
	(½ Mark for SELECT POW (Base_Num,Exp_Num) / POWER(Base_Num,Exp_Num) (½ Mark for FROM PowerTable)	
	(ii) To extract a substring from the Product_Desc column starting from the 2 nd character of length 5 from Product table.	
Ans	SELECT SUBSTR(Product_Desc, 2, 5) FROM Product; OR SELECT SUBSTRING(Product_Desc, 2, 5) FROM Product; OR SELECT MID(Product_Desc, 2, 5) FROM Product;	
	(½ Mark for SELECT, FROM Product) (½ Mark for SUBSTR(Product_Desc, 2, 5) OR MID (Product_Desc, 2, 5))	
	(iii) To trim leading spaces from the Address column in the Customer table.	
Ans	SELECT LTRIM(ADDRESS) FROM Customer ;	

	(½ Mark for <i>SELECT</i> , FROM Customer) (½ Mark for <i>LTRIM(ADDRESS)</i>)	
	(iv) To get the year from the date stored in the Join_Date column from the Employees table.	
Ans	SELECT YEAR(Join_Date) FROM Employees ;	
	(½ Mark for <i>SELECT</i> , FROM Employees) (½ Mark for correct <i>YEAR(Join_Date)</i>)	
	(v) To display the month name of the current system date.	
Ans	SELECT MONTHNAME (NOW ()) ; OR SELECT MONTHNAME (SYSDATE ()) ;	
	(½ Mark for <i>SELECT</i>) (½ Mark for correct <i>SQL function MONTHNAME(NOW()) OR MONTHNAME (SYSDATE ())</i>)	
	OR	
	(b) Write suitable SQL queries for the following :	
	(i) Display the square of each value of the Score column in the Students table.	
Ans	SELECT POW(Score,2) FROM Students; OR SELECT POWER(Score,2) FROM Students; OR SELECT Score*Score FROM Students;	
	(½ Mark for <i>SELECT</i> , FROM Students) (½ Mark for correct <i>SQL function POW(score,2)/ POWER(score,2) / Score*Score</i>)	
	(ii) From the Locations table, display names of all the cities from the City column in uppercase.	
Ans	SELECT UPPER(City) FROM Locations; OR SELECT UCASE(City) FROM Locations;	
	(½ Mark for <i>SELECT</i> , FROM Locations)	

	(½ Mark for correct SQL function UPPER(City) / UCASE(City))	
	(iii) To extract the last 3 characters from the Loc_Code column in Address table.	
Ans	SELECT RIGHT(Loc_Code, 3) FROM Address; OR SELECT MID(Loc_Code, LENGTH(Loc_Code)-2) FROM Address; OR SELECT MID(Loc_Code, LENGTH(Loc_Code)-2, 3) FROM Address; OR SELECT SUBSTR(Loc_Code, LENGTH(Loc_Code)-2) FROM Address; OR SELECT SUBSTR(Loc_Code, LENGTH(Loc_Code)-2, 3) FROM Address; OR SELECT SUBSTRING(Loc_Code, LENGTH(Loc_Code)-2) FROM Address; OR SELECT SUBSTRING(Loc_Code, LENGTH(Loc_Code)-2,3) FROM Address;	
	(½ Mark for SELECT, FROM Address) (½ Mark for RIGHT(Loc_Code, 3) OR MID(Loc_Code, LENGTH(Loc_Code)-2) OR MID(Loc_Code, LENGTH(Loc_Code)-2, 3) OR SUBSTR(Loc_Code, LENGTH(Loc_Code)-2) OR SUBSTR(Loc_Code, LENGTH(Loc_Code)-2, 3) OR SUBSTRING(Loc_Code, LENGTH(Loc_Code)-2) OR SUBSTRING(Loc_Code, LENGTH(Loc_Code)-2,3))	
	(iv) To display the current system date.	
Ans	SELECT NOW(); OR SELECT SYSDATE();	
	(½ Mark for SELECT) (½ Mark for correct SQL function NOW() OR SYSDATE())	
	(v) To find the sum of all order amounts in the Order_Amount column from the Orders table.	
Ans	SELECT SUM(Order_Amount) FROM Orders;	
	(½ Mark for SELECT, FROM Orders) (½ Mark for SUM(Order_Amount))	