

**Marking Scheme**  
**Strictly Confidential**  
**(For internal and restricted use only)**  
**Senior Secondary School Supplementary Examination 2025**  
**SUBJECT NAME: COMPUTER SCIENCE SUBJECT CODE: 083 (Set 4 Q.P. CODE 91/S)**

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 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 News Paper/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-X, 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.	
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 answer CROSS ‘X’ be marked. Evaluators will not put right ( ✓ )while evaluating which gives an impression that the 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, the 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 <b>70 marks</b> 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>• Leaving the answer or part thereof unassessed in an answer book.</li> <li>• Giving more marks for an answer than assigned to it.</li> <li>• Wrong totaling of marks awarded on an answer.</li> <li>• Wrong transfer of marks from the inside pages of the answer book to the title page.</li> <li>• Wrong question wise totaling on the title page.</li> <li>• Wrong totaling of marks of the two columns on the title page.</li> <li>• Wrong grand total.</li> <li>• Marks in words and figures not tallying/not same.</li> <li>• Wrong transfer of marks from the answer book to online award list.</li> <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	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 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.	

**Senior Secondary School Supplementary Examinations 2025**  
**MARKING SCHEME - COMPUTER SCIENCE 083**

Time allowed: 3 hours

Max. Marks: 70

**General Instructions :**

- (i) This question paper contains 37 questions.
- (ii) All questions are **compulsory**. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
- (iii) The paper is divided into 5 Sections - A, B, C, D, E.
- (iv) Section A, consists of 21 questions (1 to 21). Each question carries 1 mark.
- (v) Section B, consists of 7 questions (22 to 28). Each question carries 2 marks.
- (vi) Section C, consists of 3 questions (29 to 31). Each question carries 3 marks.
- (vii) Section D, consists of 4 questions (32 to 35). Each question carries 4 marks.
- (viii) Section E, consists of 2 questions (36 & 37). Each question carries 5 marks.
- (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		21 X 1=21
1.	State if following statement is True or False : If $\mathbf{T}$ is a tuple and $\mathbf{L}$ is a list, then $\mathbf{T+L}$ is a valid statement in Python.	1
Ans	<b>False</b>	
	<b>(1 Mark for writing the correct answer)</b>	

2.	<p>Identify the output of the following code segment :</p> <pre>s = "an apple. a toy." s=s.find('a',2) print(s)</pre> <p>(A) 0 (B) 1 (C) 3 (D) 'a'</p>	1
Ans	(C) 3	
	<b>(1 Mark for writing the correct option)</b>	
3.	<p>What is the value of the following expression ? 3 + 3·00, 3**3·0</p> <p>(A) [6·0, 27·0] (B) (6·0, 9·0) (C) (6, 27) (D) (6·0, 27·0)</p>	1
Ans	(D) (6·0, 27·0)	
	<b>(1 Mark for writing the correct option)</b>	
4.	<p>What is the output of the following expression ? Sports="Paralympic Games" print (Sports.split("m"))</p> <p>(A) ['Paraly', 'm', 'pic Ga', 'm', 'es'] (B) ('Paraly', 'm', 'pic Games') (C) ('Paraly', 'pic Ga', 'es') (D) ['Paraly', 'pic Ga', 'es']</p>	1
Ans	(D) ['Paraly', 'pic Ga', 'es']	
	<b>(1 Mark for writing the correct option)</b>	
5.	<p>What will be the output of the following code segment ? p=list("Session 2024-25") print(p[10:20:])</p>	1
Ans	['2', '4', '-', '2', '5']	
	<b>(1 Mark for writing the correct option)</b>	
6.	<p>Which of the following is a mapped data type ?</p> <p>(A) List (B) Sets (C) Dictionary (D) Boolean</p>	1
Ans	(C) Dictionary	
	<b>(1 Mark for writing the correct option)</b>	
7.	<p>If the dictionary D1 is defined as : D1={1:'a',2:'b'} then which of the following statements is <i>incorrect</i> and hence will result in an error ?</p>	1





	Which of the following statements will give 10 as output ? (A) <b>SELECT MAX(Score) FROM Scores;</b> (B) <b>SELECT MIN(Score) FROM Scores;</b> (C) <b>SELECT SUM(Score) FROM Scores;</b> (D) <b>SELECT AVG(Score) FROM Scores;</b>	
Ans	(B) <b>SELECT MIN(Score) FROM Scores;</b>	
	<b>(1 Mark for writing the correct answer)</b>	
17.	Which of the following devices is essential to set up a wired LAN ? (A) <b>Modem</b> (B) <b>NIC</b> (C) <b>Repeater</b> (D) <b>Firewall</b>	1
Ans	(B) <b>NIC</b>	
	<b>(1 Mark for writing the correct option)</b>	
18.	Which network device serves as the entry and exit point of a network, as all the data coming in or going out of a network must first pass through it? (A) <b>Modem</b> (B) <b>Gateway</b> (C) <b>Switch</b> (D) <b>Repeater</b>	1
Ans	(B) <b>Gateway</b>	
	<b>(1 Mark for writing the correct option)</b>	
19.	Which of the following IP addresses is valid? (A) <b>122.94.96.212</b> (B) <b>212.254.258.210</b> (C) <b>210.10.12.156.209</b> (D) <b>122.294.56.68</b>	1
Ans	(A) <b>122.94.96.212</b>	
	<b>(1 Mark for writing the correct option)</b>	
Q.Nos. 20 and 21 are Assertion (A) and Reason (R) based questions. Mark the correct choice 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 and Reason (R) is <b>not</b> 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.	<b>Assertion (A):</b> Every object in Python is assigned a unique identity (ID). <b>Reason (R):</b> ID remains the same for the lifetime of that object.	1
Ans	(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A).	
	<b>(1 Mark for writing the correct option)</b>	
21.	<b>Assertion (A) :</b> Foreign key column of a table cannot have <b>NULL</b> entries. <b>Reason (R) :</b> Primary key column of a table cannot have <b>NULL</b> entries.	1

Ans	(D) Assertion (A) is false but, Reason (R) is true.	
	<b>(1 Mark for writing the correct option)</b>	

SECTION B		
22.	What is the difference between = and == in Python? Give an example of each.	2
Ans	<p>= is an assignment operator to assign a value to a variable, whereas == is a relational operator to check whether two values are equal.</p> <p>Example: <b>a=5</b> assigns value to variable a.  <b>a==5</b> returns True if a has the value 5.</p>	
	<b>(1 Mark for the difference)</b> <b>(½ Mark for each example)</b>	
23.	Give an example of each of the following : (i) An expression using any one identify operator. (ii) An arithmetic expression which uses any one augmented assignment operator.	2
Ans	<p>(i)  <b>Num1=5</b>  <b>print(type(Num1) is int)</b>      # Output True  <b>OR</b>  <b>Num1=False</b>  <b>print(type(Num1) is int)</b>      # Output False</p> <p>(ii)  <b>Num1=5</b>  <b>Num1+=5</b>      <b>OR</b>  <b>Num1-=5</b>      <b>OR</b>  <b>Num1*=5</b>      <b>OR</b>  <b>Num1/=5</b>      <b>OR</b>  <b>Num1%=5</b></p>	
	<b>(1 Mark for writing each correct example)</b>	
24.	Assuming that D1 and D2 are Python dictionaries. Write the following statements using built-in functions/methods : (I) (a) To delete all the elements of D1. <b>OR</b> (b) To generate a list of values of D1. (II) (a) To update dictionary D2 with the elements of D1. <b>OR</b> (b) To generate a tuple of keys of D2.	2





	<p><i>(½ x 4 = 2 Marks for any four error correction)</i></p> <p><b>OR</b></p> <p><i>(1 Mark for only identification of all/any three errors without correction)</i></p>	
27.	<p>(I) (a) Write any one difference between <b>CHAR</b> and <b>VARCHAR</b> data types in MySQL.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) Write one difference between Primary key and Unique constraint.</p> <p>(II) (a) Write an SQL command to remove a column named <b>ADDRESS</b>, from a table named <b>CUSTOMER</b>.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) Write an SQL command to add a column named <b>ADDRESS</b>, of type <b>VARCHAR (20)</b> in a table named <b>CUSTOMER</b>.</p>	<p>1</p> <p>1</p>
Ans	<p>(I)</p> <p>(a)</p> <p><b>CHAR</b> - It is a fixed length data type.</p> <p><b>VARCHAR</b> - It is a variable length data type.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) <b>PRIMARY KEY</b> constraint does not allow <b>NULL</b> entries in the column, whereas <b>UNIQUE</b> constraint allows <b>NULL</b> entries in the column.</p> <p>(II)</p> <p>(a) <b>ALTER TABLE CUSTOMER DROP COLUMN ADDRESS ;</b></p> <p style="text-align: center;"><b>OR</b></p> <p>(b) <b>ALTER TABLE CUSTOMER ADD COLUMN ADDRESS VARCHAR (20) ;</b></p> <p>Note : Keyword <b>COLUMN</b> is optional</p>	
	<p><b>(I) (1 Mark for one difference)</b></p> <p><b>(II) (½ Mark for ALTER part ½ Mark for ADD/DROP part)</b></p>	
28.	<p>(I)</p> <p>(a) Expand the following terms : <b>POP, TCP</b></p> <p>(b) Write any one difference between a hub and a switch used in computer networks.</p> <p style="text-align: center;"><b>OR</b></p> <p>(II) (a) Write any one difference between <b>HTTP</b> and <b>HTTPS</b>.</p> <p>(b) Write names of any two wireless transmission media.</p>	2
Ans	<p>(I)</p> <p>(a) Post Office Protocol Transmission Control Protocol</p>	

(b)	<table><tr><td>Hub (Any one point)</td><td>Switch (Any one point)</td></tr><tr><td><ul style="list-style-type: none"><li>It is a multi-port device without any intelligence.</li><li>It is less efficient as compared to switch.</li><li>It is less expensive as compared to switch.</li></ul></td><td><ul style="list-style-type: none"><li>It is a multi-port device, but with intelligence.</li><li>It is more efficient as compared to hub</li><li>It is more expensive as compared to hub.</li></ul></td></tr></table> <p>OR</p>	Hub (Any one point)	Switch (Any one point)	<ul style="list-style-type: none"><li>It is a multi-port device without any intelligence.</li><li>It is less efficient as compared to switch.</li><li>It is less expensive as compared to switch.</li></ul>	<ul style="list-style-type: none"><li>It is a multi-port device, but with intelligence.</li><li>It is more efficient as compared to hub</li><li>It is more expensive as compared to hub.</li></ul>
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(II)					
(a)	<table><tr><td>HTTP</td><td>HTTPS</td></tr><tr><td><ul style="list-style-type: none"><li>It is not a secured Protocol.</li><li>Hyper Text Transfer Protocol</li></ul></td><td><ul style="list-style-type: none"><li>It is a secured Protocol.</li><li>Hyper Text Transfer Protocol Secure</li></ul></td></tr></table>	HTTP	HTTPS	<ul style="list-style-type: none"><li>It is not a secured Protocol.</li><li>Hyper Text Transfer Protocol</li></ul>	<ul style="list-style-type: none"><li>It is a secured Protocol.</li><li>Hyper Text Transfer Protocol Secure</li></ul>
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<ul style="list-style-type: none"><li>It is not a secured Protocol.</li><li>Hyper Text Transfer Protocol</li></ul>	<ul style="list-style-type: none"><li>It is a secured Protocol.</li><li>Hyper Text Transfer Protocol Secure</li></ul>				
(b)	Commonly used wireless communication media are : <ul style="list-style-type: none"><li>Radio wave</li><li>Microwave</li><li>Infrared</li></ul> (Any two)				

(I) (a) ( $\frac{1}{2}$ Mark for writing each correct expansion)	
(b) (1 Mark for writing correct difference)	
OR	
(II) (a) (1 Mark for writing correct difference)	
(b) ( $\frac{1}{2}$ Mark each for writing any two correct name of wireless media)	

SECTION C		
29.	<p>(a) Write a Python function that displays all the lines ending with a dot (.) from a text file "Colors.txt". For example, if the file contains :</p> <pre> White is a mix of seven colors. What are these seven colors ? VIBGYOR - violet, indigo, blue, green, orange and red. When we mix all these colors we just get one light which is the WHITE light.  Then the output should be : White is a mix of seven colors. VIBGYOR - violet, indigo, blue, green, orange and red. which is the WHITE light.  (Hint : You will have to ignore trailing white spaces to check the last character) </pre> <p style="text-align: center;">OR</p>	3

	(b) Write a function in Python to display the line which has the maximum number of vowels from a text file, "Novel.txt".	
Ans	<p>(a)</p> <pre>def Colors():     with open("colors.txt") as F:         Lines=F.readlines()         for L in Lines:             if L[-1]=='.':                 print(L)</pre> <p>OR</p> <p>Any other equivalent correct code</p> <p>OR</p> <p>(b)</p> <pre>def words():     with open("Novel.txt") as F:         Lines=F.readlines()         MaxV=0;LV=""         for L in Lines:             CV=0             for C in L:                 if C in "AEIOUaeiou":                     CV+=1             if CV&gt;MaxV:                 MaxV=CV                 LV=L         print(LV)</pre> <p>OR</p> <p>Any other equivalent correct code</p>	
	<p>(a)</p> <p><i>(½ mark for the function header)</i>  <i>(½ mark for opening the file)</i>  <i>(½ mark for reading the file)</i>  <i>(½ mark for stripping the line)</i>  <i>(½ mark for checking the condition)</i>  <i>(½ mark for displaying the line)</i></p> <p>OR</p>	
	<p>(b)</p> <p><i>(½ mark for correct function header)</i>  <i>(½ mark for correctly opening the file)</i>  <i>(½ mark for correctly reading from the file)</i>  <i>(½ mark for correctly using the outer for loop)</i>  <i>(½ mark for correctly using the inner for loop)</i>  <i>(½ mark for correctly using the if statement)</i></p>	
30.	(a) A stack named <b>KeyStack</b> contains records of some computer keyboards. Each record is represented as a list containing <b>Make</b> , <b>Keys</b> , <b>Connectivity</b> . The <b>Make</b> and <b>Connectivity</b> are strings, and <b>Keys</b> is an integer. For example, a record in the stack may be ('Hitech', 105, 'USB').	3x1 =3

	<p>Write the following user-defined functions in Python to perform the specified operations on <b>KeyStack</b> :</p> <table><tr><td>(i)</td><td><b>push_key(KeyStack, new_key)</b> : This function takes the stack <b>KeyStack</b> and a new record <b>new_key</b> as arguments and pushes this new record onto the stack.</td></tr><tr><td>(ii)</td><td><b>pop_key(KeyStack)</b> : This function pops the topmost record from the stack and returns it. If the stack is already empty, the function should display the message "Underflow".</td></tr><tr><td>(iii)</td><td><b>isEmpty(KeyStack)</b> : This function checks whether the stack is empty. If the stack is empty, the function should return True, otherwise the function should return False.</td></tr></table>	(i)	<b>push_key(KeyStack, new_key)</b> : This function takes the stack <b>KeyStack</b> and a new record <b>new_key</b> as arguments and pushes this new record onto the stack.	(ii)	<b>pop_key(KeyStack)</b> : This function pops the topmost record from the stack and returns it. If the stack is already empty, the function should display the message "Underflow".	(iii)	<b>isEmpty(KeyStack)</b> : This function checks whether the stack is empty. If the stack is empty, the function should return True, otherwise the function should return False.	
(i)	<b>push_key(KeyStack, new_key)</b> : This function takes the stack <b>KeyStack</b> and a new record <b>new_key</b> as arguments and pushes this new record onto the stack.							
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Ans	<p>(a)</p> <table><tr><td>(I)</td><td><pre>def push_key(KeyStack, new_Key) :     KeyStack.append(new_Key)</pre></td></tr><tr><td>(II)</td><td><pre>def pop_key(KeyStack) :     if not KeyStack:         print("Underflow")     else:         return (KeyStack.pop())</pre></td></tr><tr><td>(III)</td><td><pre>def isEmpty(KeyStack) :     return KeyStack==[] :</pre></td></tr></table>	(I)	<pre>def push_key(KeyStack, new_Key) :     KeyStack.append(new_Key)</pre>	(II)	<pre>def pop_key(KeyStack) :     if not KeyStack:         print("Underflow")     else:         return (KeyStack.pop())</pre>	(III)	<pre>def isEmpty(KeyStack) :     return KeyStack==[] :</pre>	
(I)	<pre>def push_key(KeyStack, new_Key) :     KeyStack.append(new_Key)</pre>							
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(III)	<pre>def isEmpty(KeyStack) :     return KeyStack==[] :</pre>							
	<p>(I) <i>(1 Mark for correct definition of <code>KeyStack.append(new_Key)</code>)</i></p> <p>(II) <i>(½ Mark for correctly checking and displaying "Underflow")</i> <i>(½ Mark for correctly popping and returning popped tuple/data)</i></p> <p>(III) <i>(½ Mark for correctly checking whether the Stack is Empty or not)</i> <i>(½ Mark for correctly returning/printing the required values)</i></p>							
	<p style="text-align: center;"><b>OR</b></p> <p>(b) Write the following user-defined functions in Python :</p> <table><tr><td>(i)</td><td><b>push_vowels(s,st)</b> : Here <b>s</b> is a string and <b>st</b> is a list representing a stack. The function should push all the vowels of the string <b>s</b> onto the stack <b>st</b>. For example, if the string <b>s</b> is "Easy Concepts", then the function <b>push_vowels()</b> should push the elements 'E', 'a', 'o', 'e' onto the stack.</td></tr><tr><td>(ii)</td><td><b>pop_one(st)</b> : The function should pop an element from the stack <b>st</b>, and return this element. If the stack is empty, then the function should display the message 'Stack Underflow', and return None.</td></tr></table>	(i)	<b>push_vowels(s,st)</b> : Here <b>s</b> is a string and <b>st</b> is a list representing a stack. The function should push all the vowels of the string <b>s</b> onto the stack <b>st</b> . For example, if the string <b>s</b> is "Easy Concepts", then the function <b>push_vowels()</b> should push the elements 'E', 'a', 'o', 'e' onto the stack.	(ii)	<b>pop_one(st)</b> : The function should pop an element from the stack <b>st</b> , and return this element. If the stack is empty, then the function should display the message 'Stack Underflow', and return None.			
(i)	<b>push_vowels(s,st)</b> : Here <b>s</b> is a string and <b>st</b> is a list representing a stack. The function should push all the vowels of the string <b>s</b> onto the stack <b>st</b> . For example, if the string <b>s</b> is "Easy Concepts", then the function <b>push_vowels()</b> should push the elements 'E', 'a', 'o', 'e' onto the stack.							
(ii)	<b>pop_one(st)</b> : The function should pop an element from the stack <b>st</b> , and return this element. If the stack is empty, then the function should display the message 'Stack Underflow', and return None.							

		(iii) <code>display_all(St)</code> : The function should display all the elements of the stack <code>st</code> , without deleting them. If the stack is empty, the function should display the message 'Empty Stack'.	
Ans	(b)	<div>(i) <pre>def push_vowels(S, St):     vowels = 'AEIOUaeiou'     for ch in S:         if ch in vowels:             St.append(ch)</pre></div> <div>(ii) <pre>def pop_one(St):     if len(St) == 0:         print("Stack Underflow")         return None     else:         return St.pop()</pre></div> <div>(iii) <pre>def display_all(St):     if len(St) == 0:         print("Empty Stack")     else:         print("Stack contents:", St)</pre></div>	
	(i) <i>(1 Mark for correct definition of push_vowels(S, St))</i> (ii) <i>(½ Mark for correctly checking and displaying “Stack Underflow”)</i> <i>(½ Mark for correctly popping and returning last element)</i> (iii) <i>(½ Mark correctly checking Empty condition)</i> <i>(½ Mark correctly displaying content in the stack)</i>		
31.	(a) Write the output on execution of the following Python code : <pre>P=[3,5,7,4] P.insert(2,3) P.extend([10, 6]) print(P) print(P.index(7)) print(P[:2])</pre>		3
Ans	<pre>[3, 5, 3, 7, 4, 10, 6] 3 [3, 3, 4, 6]</pre>		
	<b>Line1 of output:</b> <i>(1 Mark for all correct values)</i>		

	<p><b>OR</b> (½ Mark for writing first four values of output correctly)</p> <p><b>Line2 of output:</b> (1 Mark for correct line of output)</p> <p><b>Line3 of output:</b> (1 Mark for all correct values)</p> <p><b>OR</b> (½ Mark for writing first two values of output correctly)</p>	
	<p style="text-align: center;"><b>OR</b></p> <p>(b) Write the output on execution of the following Python code :</p> <pre>def ALTER(Y=25) :     global X     Y += X     X += Y     print(X,Y,sep="#") X=5; Y=15 ALTER(Y) ALTER() print(X,Y,sep="@")</pre>	
Ans	<p>25#20 75#50 75@15</p>	
	<p>(½ Mark for writing each correct numeric value of output)</p> <p><b>Note: Deduct only ½ mark if # or @ or newline is not considered in the output</b></p>	

SECTION D																																			
32.	Consider the table <b>STAFF</b> given below : <b>Table : STAFF</b>				4x1=4																														
	<table><tr><th>STAFF_ID</th><th>STAFF_NAME</th><th>SALARY</th><th>DEPARTMENT</th><th>DESIGNATION</th></tr><tr><td>S101</td><td>SUNITA</td><td>26000</td><td>MATHS</td><td>TGT</td></tr><tr><td>S201</td><td>SUNIL</td><td>80000</td><td>COMMERCE</td><td>PGT</td></tr><tr><td>S301</td><td>NEHA</td><td>35000</td><td>SCIENCE</td><td>TGT</td></tr><tr><td>S102</td><td>MANJEET</td><td>25000</td><td>MATHS</td><td>TGT</td></tr><tr><td>S202</td><td>MANNAN</td><td>45000</td><td>COMPUTER</td><td>TGT</td></tr></table>				STAFF_ID	STAFF_NAME	SALARY	DEPARTMENT	DESIGNATION	S101	SUNITA	26000	MATHS	TGT	S201	SUNIL	80000	COMMERCE	PGT	S301	NEHA	35000	SCIENCE	TGT	S102	MANJEET	25000	MATHS	TGT	S202	MANNAN	45000	COMPUTER	TGT	
STAFF_ID	STAFF_NAME	SALARY	DEPARTMENT	DESIGNATION																															
S101	SUNITA	26000	MATHS	TGT																															
S201	SUNIL	80000	COMMERCE	PGT																															
S301	NEHA	35000	SCIENCE	TGT																															
S102	MANJEET	25000	MATHS	TGT																															
S202	MANNAN	45000	COMPUTER	TGT																															
	(a) Write the suitable SQL queries to perform the following tasks :																																		
	(I) To display the average salary of each department.																																		

Ans	SELECT DEPARTMENT, AVG(SALARY) FROM STAFF GROUP BY DEPARTMENT;				
	(½ Mark for correctly writing SELECT DEPARTMENT, AVG(SALARY) FROM STAFF) (½ Mark for correctly writing GROUP BY DEPARTMENT)				
	(II) To insert the following record in the table, STAFF. STAFF_ID : S333 STAFF_NAME : GURMEET SALARY : 15000 DEPARTMENT : ADMIN DESIGNATION : CLERK				
Ans	INSERT INTO STAFF VALUES ('S333', 'GURMEET', 15000, 'ADMIN', 'CLERK');				
	(½ Mark for correctly writing INSERT INTO STAFF or Equivalent) (½ Mark for correctly writing VALUES ('S333', 'GURMEET', 15000, 'ADMIN', 'CLERK');				
	(III) To display the unique designations from the table.				
Ans	SELECT DISTINCT DESIGNATION FROM STAFF;				
	(½ Mark for writing SELECT ..... DESIGNATION FROM STAFF part) (½ Mark for writing DISTINCT clause)				
	(IV) To display all the details of the staff whose name is of four letters.				
Ans	SELECT * FROM STAFF WHERE STAFF_NAME LIKE '____';				
	(½ Mark for writing SELECT * FROM STAFF) (½ Mark for writing WHERE STAFF_NAME LIKE '____' OR Any other equivalent option)				
	OR (b) Write the output for the queries given below :				
	(I) SELECT STAFF_NAME FROM STAFF WHERE SALARY BETWEEN 25000 AND 30000;				
Ans	<table><tr><td>STAFF_NAME</td></tr><tr><td>SUNITA</td></tr><tr><td>MANJEET</td></tr></table>	STAFF_NAME	SUNITA	MANJEET	
STAFF_NAME					
SUNITA					
MANJEET					



	(1 Mark for writing correct output)											
	(II) SELECT * FROM STAFF WHERE DEPARTMENT = "MATHS" AND SALARY > 25000;											
Ans	<table><tr><td>STAFF_ID</td><td>STAFF_NAME</td><td>SALARY</td><td>DEPARTMENT</td><td>DESIGNATION</td></tr><tr><td>S101</td><td>SUNITA</td><td>26000</td><td>MATHS</td><td>TGT</td></tr></table>	STAFF_ID	STAFF_NAME	SALARY	DEPARTMENT	DESIGNATION	S101	SUNITA	26000	MATHS	TGT	
STAFF_ID	STAFF_NAME	SALARY	DEPARTMENT	DESIGNATION								
S101	SUNITA	26000	MATHS	TGT								
	(1 Mark for writing correct output)											
	(III) SELECT STAFF_NAME, STAFF_ID FROM STAFF WHERE DEPARTMENT LIKE "%S";											
Ans	<table><tr><td>STAFF_NAME</td><td>STAFF_ID</td></tr><tr><td>SUNITA</td><td>S101</td></tr><tr><td>MANJEET</td><td>S102</td></tr></table>	STAFF_NAME	STAFF_ID	SUNITA	S101	MANJEET	S102					
STAFF_NAME	STAFF_ID											
SUNITA	S101											
MANJEET	S102											
	(1 Mark for writing correct output)											
	(IV) SELECT MAX(SALARY) FROM STAFF;											
Ans	<table><tr><td>MAX(SALARY)</td></tr><tr><td>80000</td></tr></table>	MAX(SALARY)	80000									
MAX(SALARY)												
80000												
	(1 Mark for writing correct output)											
33.	<p>Suman is an intern at a software startup. The company has assigned her a task to create a CSV file named CLUB.CSV, to store the records of the Club members. After discussing with Club Incharge, Suman has planned to store the following content of members in the file CLUB.CSV :</p> <p>[Mno, Name, Mobile, Fee]</p> <p>Where</p> <p>Mno - Member Number</p> <p>Name - Name of the Member</p> <p>Mobile - Member's Mobile Number</p> <p>Fee - Fee amount</p> <p>Assuming you are asked to help Suman in her assignment, write a Python code for performing the following tasks with the help of user-defined functions :</p> <p>NewMembers() : to accept records of members from the user and add them to the file CLUB.CSV.</p> <p>PriorityMember() : to find and display those members from the file CLUB.CSV, who are paying Fee more than 35000.</p>	4										

Ans	<pre>import csv  def NewMembers():     with open("CLUB.CSV","a") as F:         # File Mode "w" also acceptable         Writer = csv.writer(F)         while True:             Mno = input("Member Number: ")             Name = input("Name: ")             Mobile = input("Mobile : ")             Fee = float(input("Fee : "))             Writer.writerow([Mno, Name, Mobile, Fee])             Ch = input("More? (Y/N): ")             if Ch in 'nN': # or if Ch=="N":                 break  def PriorityMember():     with open("CLUB.CSV","r") as F: # File Mode is optional         Recs = csv.reader(F)         for R in Recs:             Fee = float(R[3])             if Fee &gt; 35000:                 print(R)</pre>																																	
	<p>(Marking Scheme for NewMembers()) (½ Mark for opening the csv file in correct mode) (1 Mark for accepting the records from the user) (½ Mark for writing in csv file)</p> <p>(marking Scheme for PriorityMember()) (½ Mark for opening the csv file in correct mode) (½ Mark for reading the records from csv file) (1 Mark for finding &amp; displaying the of records according to given condition)</p>																																	
34.	<p>Assume that you are working for ABC Corporation (ABCC). ABCC allots contracts to different contractors for some of its works. The data of Contracts and Contractors are kept in the tables <b>Work</b> and <b>Contractor</b> respectively. Following are a few records from these two tables of ABCC's database.</p> <p style="text-align: center;">Table : Work</p> <table><tr><th>W_ID</th><th>C_ID</th><th>W_Name</th><th>W_Amt</th></tr><tr><td>P0001</td><td>C_01</td><td>Painting</td><td>20000</td></tr><tr><td>E0001</td><td>C_01</td><td>Electrical</td><td>50000</td></tr><tr><td>D0001</td><td>C_02</td><td>Dumping</td><td>10000</td></tr></table> <p style="text-align: center;">Table : Contractor</p> <table><tr><th>C_ID</th><th>C_Name</th><th>Phone</th><th>email</th></tr><tr><td>C_01</td><td>M. Khan &amp; Sons</td><td>1232311</td><td>MK@xyz.com</td></tr><tr><td>C_02</td><td>Acharya Pvt. Ltd.</td><td>2323311</td><td>APL@xyz.com</td></tr><tr><td>C_03</td><td>Charu Corp.</td><td>NULL</td><td>CCP@pqr.xyz</td></tr></table>	W_ID	C_ID	W_Name	W_Amt	P0001	C_01	Painting	20000	E0001	C_01	Electrical	50000	D0001	C_02	Dumping	10000	C_ID	C_Name	Phone	email	C_01	M. Khan & Sons	1232311	MK@xyz.com	C_02	Acharya Pvt. Ltd.	2323311	APL@xyz.com	C_03	Charu Corp.	NULL	CCP@pqr.xyz	4x1 =4
W_ID	C_ID	W_Name	W_Amt																															
P0001	C_01	Painting	20000																															
E0001	C_01	Electrical	50000																															
D0001	C_02	Dumping	10000																															
C_ID	C_Name	Phone	email																															
C_01	M. Khan & Sons	1232311	MK@xyz.com																															
C_02	Acharya Pvt. Ltd.	2323311	APL@xyz.com																															
C_03	Charu Corp.	NULL	CCP@pqr.xyz																															

	<p>Note : The tables contain many more records than shown here. As an employee of ABCC, you are required to write the SQL queries for the following :</p> <p>(I) To display all the records from the Work table in alphabetical order of <b>W_Name</b>.</p> <p>(II) To display the names of contractors where <b>W_Amt</b> is more than 15000.</p> <p>(III) To display the structure of <b>Work</b> table.</p> <p>(IV) (a) To count total number of records present in <b>Work</b> table. OR (b) To delete the records of contractors whose phone number is not known.</p>	
Ans	(I) <b>SELECT * FROM Work ORDER BY W_Name;</b>	
	<p><i>(½ Mark for SELECT * FROM Work)</i>  <i>(½ Mark for ORDER BY W_Name)</i></p>	
	<p>(II) <b>SELECT C_Name FROM Work, Contractor WHERE Work.C_ID = Contractor.C_ID AND W_Amt &gt; 15000; OR SELECT C_Name FROM Work W, Contractor C WHERE W.C_ID = C.C_ID AND W_Amt &gt; 15000;</b></p>	
	<p><i>(½ Mark for SELECT C_Name FROM Work, Contractor or equivalent)</i>  <i>(½ Mark for WHERE Work.C_ID = Contractor.C_ID AND W_Amt &gt; 15000 or equivalent)</i></p>	
	<p>(III) <b>DESC Work; OR DESCRIBE Work;</b></p>	
	<p><i>(½ Mark for DESC or DESCRIBE)</i>  <i>(½ Mark for writing table name Work after DESC/DESCRIBE)</i></p>	
	<p>(IV) (a) <b>SELECT COUNT(*) FROM Work;</b></p>	
	<p><i>(½ Mark for SELECT COUNT(*))</i>  <i>(½ Mark for FROM Work)</i></p>	
	<p><b>OR</b> (b) <b>DELETE FROM Contractor WHERE Phone IS NULL;</b></p>	
	<p><i>(½ Mark for DELETE FROM Contractor)</i>  <i>(½ Mark for WHERE Phone IS NULL)</i></p>	

35.	<p>Nutan Kumar is using Python connectivity with MySQL for maintaining data for a table named <b>MEDICINES</b> in a database <b>PHARMACY</b>. The table has the following attributes :</p> <ul style="list-style-type: none"> <li>• <b>MId</b> (Medicine number) - string</li> <li>• <b>Mname</b> (Medicine Name) - string</li> <li>• <b>Expiry</b> (Expiry Date) - Date</li> <li>• <b>Status</b> (Active/Discard) - string</li> </ul> <p>Consider the following to establish connectivity between Python and MySQL :</p> <ul style="list-style-type: none"> <li>• <b>Username</b> - root</li> <li>• <b>Password</b> - tiger</li> <li>• <b>Host</b> - localhost</li> </ul> <p>Help Nutan to write the definition of a user-defined function named <b>ChangeStatus()</b> in Python to change the Status of the Medicines whose Expiry is before '2022-12-31' as 'DISCARD'.</p>	4
Ans	<pre>import mysql.connector  def ChangeStatus():     conn = mysql.connector.connect(         host="localhost",         user="root",         password="tiger",         database="PHARMACY")      CUR = conn.cursor()     SQL = "UPDATE MEDICINES SET Status = 'DISCARD'           WHERE Expiry &lt; '2022-12-31'";     CUR.execute(SQL)     conn.commit()     conn.close()  OR  Any equivalent valid code</pre>	
	<p><i>(1 Mark for creating correct connectivity)</i>  <i>(1 Mark for creating the cursor)</i>  <i>(1 Mark for correct formation of Query)</i>  <i>(½ Mark for correct execution of the query)</i>  <i>(½ Mark for correctly using commit() )</i></p> <p><b>Note:</b>  <i>(½ Mark for importing any valid module, if marks allocated are less than 4)</i></p>	
<b>SECTION E</b>		
36.	<p>Keshav is the IT Head in a hospital. He needs to manage the records of all the doctors in the hospital. For this, he wants to store the following information of each doctor in a file :</p> <p><b>D_ID</b> - An integer to store Doctor ID.  <b>D_Name</b> - A string to store doctor's name.  <b>D_Dept</b> - A string to store the Department of the doctor.                    (Surgery, Radiology, etc.)  <b>Experience</b> - An integer to store doctor's experience (in years)</p>	1+2+ 2=5

	<p>For example, a doctor's information may be :</p> <pre>[1256, 'R. Gupta', 'Cardiology', 15]</pre> <p>As an applicant for the post of a Programmer, you have to answer the following questions in this context :</p> <p>(I) Write one difference of storing this data in a binary file over a CSV file.</p> <p>(II) Assume that the data is stored in a binary file, named <b>DOCTORS.DAT</b>, and each record is stored as a list. Write a function, in Python, to read and display all the records from the file <b>DOCTORS.DAT</b>.</p> <p>(III) Write a function <b>addDoctor()</b>, in Python, which accepts a doctor's data from the user and writes it in the file <b>DOCTORS.DAT</b>.</p>	
Ans	<p>(I)</p> <p><b>Binary File (Any one)</b></p> <ul style="list-style-type: none"> <li>• Stores data in a non-human-readable format i.e. it can not be read from notepad/text editor.</li> <li>• Requires to import <b>pickle</b> module to create binary file in Python</li> </ul> <p><b>CSV File (Any one)</b></p> <ul style="list-style-type: none"> <li>• <b>Comma Separated Values</b> stores data in a human-readable text i.e. it can be read from notepad/text editor or any spreadsheet software.</li> <li>• Requires to import <b>csv</b> module to create csv file in Python</li> <li>• It is strongly recommended to save this file with an extension <b>csv</b>.</li> </ul> <p>(II)</p> <pre>import pickle def displayDoctors():     F = open("DOCTORS.DAT", "rb")     try:         while True:             Data = pickle.load(F)             for D in Data:                 print(D)     except:         F.close()</pre> <p>OR</p> <pre>import pickle def displayDoctors():     F = open("DOCTORS.DAT", "rb")     Data = pickle.load(F)     for D in Data:         print(D)     F.close()</pre> <p>(III)</p> <pre>import pickle def AddDoctor():     with open("DOCTORS.DAT", "ab") as F:         # File mode "wb" also acceptable         D_ID = int(input("Doctor ID: "))         D_Name = input("Doctor's Name: ")         D_Dept = input("Department: ")</pre>	

	<pre> Experience = int(input("Experience: ")) Doctor = [D_ID, D_Name, D_Dept, Experience] pickle.dump(Doctor, F) print("Doctor added!") </pre> <p>OR</p> <pre> import pickle def AddDoctor():     with open("DOCTORS.DAT", "wb") as F:         Doctor=[]         while True:             D_ID = int(input("Doctor ID: "))             D_Name = input("Doctor's Name: ")             D_Dept = input("Department: ")             Experience = int(input("Experience: "))             Doctor.append([D_ID, D_Name, D_Dept, Experience])             C=input("More (Y/N) ?")             if C=='N':                 break         pickle.dump(Doctor, F)         print("Doctor added!") </pre> <p>OR</p> <p>Any other equivalent code</p>	
	<p>(i) (1 mark for any one valid difference)</p> <p>(ii) (½ Mark for opening the file in correct mode) (1 Mark for reading each record) (½ Mark for correctly displaying records)</p> <p>(iii) (½ Mark for opening the file in correct mode) (½ Mark for accepting data) (1 Mark for writing the data in the Binary File)</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• No mark should be deducted for absence of a try - except block.</li> <li>• No mark should be deducted for the absence of the import pickle,</li> <li>• However, ½ mark should be awarded if only import pickle is mentioned as the answer to Qno. 36 (all parts)</li> </ul>	

37.

5x1=5

‘CKNG Auto’ is a big car-selling agency having its Head Office in Delhi. It is planning to set up a new branch in Patiala. The Patiala branch will have four blocks - ADMIN, SALES, SERVICE and INSURANCE. You, as a network expert, need to suggest the best network-related solutions for them to resolve the issues/problems mentioned in points (I) to (V), keeping the following parameters in mind.

Patiala Branch →

ADMIN Block

SALES Block

SERVICE Block

INSURANCE Block

Block to Block distances (in metres) :

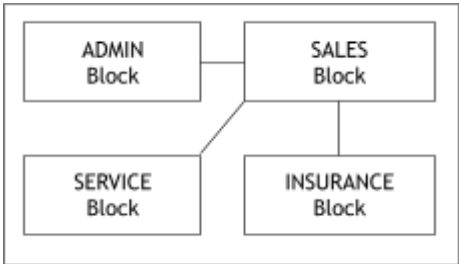
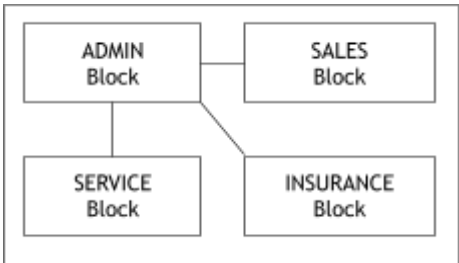
From	To	Distance
ADMIN	SALES	70 m
ADMIN	SERVICE	60 m
ADMIN	INSURANCE	65 m
SALES	SERVICE	80 m
SALES	INSURANCE	100 m
SERVICE	INSURANCE	60 m

Distance of Delhi Head Office from Patiala branch = 250 km

Number of computers in each block is as follows :

Block	No. of Computers
ADMIN	18
SALES	30
SERVICE	20
INSURANCE	10

(I)	Suggest the most appropriate location of the server inside the Patiala branch. Justify your choice.
(II)	What kind of network (PAN/LAN/MAN/WAN) will be formed by interconnecting all the computers inside a block ?
(III)	Draw the most effective cable layout to connect all four blocks of Patiala branch.
(IV)	Which device should be used to provide Internet connection to all the computers in the Patiala branch ?
(V)	Which is the best wired medium to connect server of Patiala office to the head office at Delhi ? OR Is there a need for repeater(s) in Patiala branch ? Why, or why not ?

Ans	<p>(I) SALES Block as it has the maximum number of Computers. OR ADMIN Block as is closest to all the blocks. OR Any other location with valid justification.</p> <p><b>(1 Mark for suggesting a block with valid justification)</b></p>	
	(II) LAN	
	<b>(1 Mark for writing correct answer)</b>	
	<p>(III)</p>  <p>OR</p>  <p>OR Any other valid efficient cable layout</p>	
	<b>(1 Mark for drawing the correct cable layout)</b>	
	<p>(IV) Router (most preferred) Switch/Hub (may be considered)</p> <p><b>(1 Mark for writing the correct answer)</b></p>	
	<p>(V)</p> <p>(a) Optical fibre OR (b) Repeater is not required as distances are within the permissible limits. OR Repeater is recommended as some of the distances are around permissible limits OR Repeater is not required if Optical Fibre is used.</p>	
	<p><b>(a) (1 Mark for writing the correct answer)</b> OR <b>(b) (1 Mark for writing the correct answer)</b></p>	