

Marking Scheme

Strictly Confidential

(For internal and restricted use only)

Senior Secondary School Examination 2026

SUBJECT NAME: COMPUTER SCIENCE SUBJECT CODE: 083 (Set 4 Q.P. CODE 91)

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 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. 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.	
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 answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.	
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 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 :- <ul style="list-style-type: none"> • 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	The Examiners should acquaint themselves with the guidelines given in the “Guidelines for Spot Evaluation” before starting the actual evaluation.	
16	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.	
17	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.	
18	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.	

MARKING SCHEME

COMPUTER SCIENCE 083

Maximum 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 and 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		(21x1=21)
1.	State True or False : In Python, data type of 74 is same as the data type of 74.0.	1
Ans	False	
	(1 mark for writing the correct answer)	

	(1 Mark for writing the correct option)	
7.	Which of the following statements is true about dictionaries in Python? (A) A dictionary is an example of sequence datatype. (B) A dictionary cannot have two elements with same key. (C) A dictionary cannot have two elements with same value. (D) The key and value of an element cannot be the same.	1
Ans	(B) A dictionary cannot have two elements with same key.	
	(1 Mark for writing the correct option)	
8.	If <code>L</code> is a list with 6 elements, then which of the following statements will raise an exception ? (A) <code>L.pop(1)</code> (B) <code>L.pop(6)</code> (C) <code>L.insert(1, 6)</code> (D) <code>L.insert(6, 1)</code>	1
Ans	(B) <code>L.pop(6)</code>	
	(1 Mark for writing the correct option)	
9.	What will be the output of the following code ? <code>def f1(a,b=1):</code> <code>print(a+b,end='-')</code> <code>c=f1(1,2)</code> <code>print(c,sep='*')</code> (A) 3-2 (B) 3-2* (C) 3-None (D) 3*None-	1
Ans	(C) 3-None	
	(1 Mark for writing the correct option)	
10.	Consider the statement given below : <code>f1 = open("pqr.dat", "_____")</code> Which of the following is the correct file mode to open the file in read only mode ? (A) <code>a</code> (B) <code>rb</code> (C) <code>r+</code> (D) <code>rb+</code>	1
Ans	(B) <code>rb</code>	
	(1 Mark for writing the correct option)	
11.	State whether the following statement is True or False : In Python, Logical errors can be handled using <code>try...except...finally</code> statement.	1
Ans	False	

	(1 mark for writing the correct answer)	
12.	<p>A table has two candidate keys, one of which is chosen as the primary key. How many alternate keys does this table have ?</p> <p>(A) 0 (B) 1 (C) 2 (D) 3</p>	1
Ans	(B) 1	
	(1 Mark for writing the correct option)	
13.	<p>Which of the following SQL command can change the degree of the existing relation ?</p> <p>(A) DROP TABLE (B) ALTER TABLE (C) UPDATE...SET (D) DELETE</p>	1
Ans	(B) ALTER TABLE	
	(1 Mark for writing the correct option)	
14.	<p>What will be the output of the query ?</p> <p>SELECT MACHINE_ID, MACHINE_NAME FROM INVENTORY WHERE QUANTITY <= 100;</p> <p>(A) All columns of INVENTORY table with quantity greater than 100 (B) ID and name of machines with quantity less than 100 from INVENTORY table (C) All columns of INVENTORY table with quantity greater than or equal to 100 (D) ID and name of machines with quantity less than or equal to 100 from INVENTORY table.</p>	1
Ans	(D) ID and name of machines with quantity less than or equal to 100 from INVENTORY table.	
	(1 Mark for writing the correct option)	
15.	<p>A relation in MySQL database consists of 2 tuples and 3 attributes. If 2 attributes are deleted and 4 tuples are added, what will be the cardinality of the relation ?</p> <p>(A) 4 (B) 5 (C) 6 (D) 7</p>	1
Ans	(C) 6	
	(1 Mark for writing the correct option)	
16.	<p>Which aggregate function in SQL returns the smallest value from a column in a table ?</p> <p>(A) MIN() (B) MAX()</p>	1

	(C) SMALL () (D) LOWER ()	
Ans	(A) MIN ()	
	(1 Mark for writing the correct option)	
17.	With respect to computer networks, which of the following is the correct expanded form of RJ 45? (A) Radio Jockey 45 (B) Registered Jockey 45 (C) Radio Jack 45 (D) Registered Jack 45	1
Ans	(D) Registered Jack 45	
	(1 Mark for writing the correct option)	
18.	Which network device serves as the entry and exit point of a network, as all data coming in or going out of a network must first pass through it in order to use routing paths ? (A) Modem (B) Gateway (C) Switch (D) Repeater	1
Ans	(B) Gateway	
	(1 Mark for writing the correct option)	
19.	Expand the term XML.	1
Ans	Extensible Markup Language	
	(½ Mark for writing the correct full form of X as eXtensible) (½ Mark for writing correct full form of ML as Markup Language)	
	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 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): [1, 2, 3]+'123' is an invalid expression in Python. Reason (R): In Python, a list cannot be concatenated with a string.	1
Ans	(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A).	
	(1 Mark for writing the correct option)	
21.	Assertion (A) : The PRIMARY KEY constraint in SQL ensures that each value in	1

	the column(s) is unique and cannot be NULL . Reason (R) : Candidate keys are not eligible to become a primary key.	
Ans	(C) Assertion (A) is true, but Reason (R) is false.	
	(1 Mark for writing the correct option)	

SECTION B		(7x2=14)
22.	What is the difference between default parameters and positional parameters in Python ? Also give an example of a function header which uses both.	2
Ans	<ul style="list-style-type: none"> • Default parameters have default values whereas positional parameters are assigned values to them based on their position in the function call. • In a function header, default parameters are always written after positional parameters(if any). OR Any other valid difference (only one) Example : <pre>def Q22(X, Y=10): # Here Y is default & X is positional # parameter</pre> OR Any other valid example	
	(1 mark for writing any one correct difference) (1 mark for writing any one correct example uses both type) OR (Full 2 marks for correct explanation with the help of a suitable example)	
23.	Write a Python statement to perform the following tasks : (USE BUILT-IN FUNCTIONS/METHODS ONLY)	2
	(i) To create a new list L1 containing the elements of list L arranged in ascending order, without modifying list L .	
Ans	(i) <code>L1=sorted(L)</code> OR <code>L1=list(L)</code> <code>L1.sort()</code> OR Any other correct option	
	(1 mark for writing the correct statement) OR (½ mark for only mentioning the correct method(s) or function(s))	
	(ii) A statement to check whether the given character, ch is an alphabet or a number.	
Ans	(ii) <code>ch.isalnum()</code> OR	

	<code>ch.isdigit()</code> or <code>ch.isalpha()</code> OR Any other method(s) for the required task	
	<i>(1 mark for writing the correct statement with a method/combination of methods)</i> OR <i>(½ mark for only mentioning the method(s) or function(s))</i>	
24.	Assuming that D1 is a dictionary in Python,	2
	(i) (a) Write a Python expression to check if the key, 'RNo' is present in D1.	
Ans	(i) (a) <code>'RNo' in D1</code> OR <code>'RNo' in D1.keys()</code>	
	<i>(1 mark for writing the correct statement)</i> OR <i>(½ mark for only mentioning the 'in' or correct equivalent operator(s))</i>	
	OR (i) (b) Write a Python expression to check if any key in D1 has a value 12.	
Ans	(i) (b) <code>12 in D1.values()</code>	
	<i>(1 mark for writing the correct statement)</i> OR <i>(½ mark for only mentioning the 'in' or correct equivalent operator(s))</i>	
	(ii) (a) Write a single statement using a BUILT-IN function to add the key : value pair 'RNo':12, if the key 'RNo' is not present in D1. However, if the key 'RNo' is present, the function should return its value.	
Ans	(ii) (a) <code>D1.setdefault('RNo',12)</code> OR <pre>if D1.get('RNo'):</pre> <code>print(D1['RNo'])</code> <code># return D1['RNo']</code> <pre>else:</pre> <code>D1['RNo']=12</code> OR Any other correct equivalent statement	
	<i>(1 mark for writing the correct statement)</i> OR <i>(½ mark for mentioning setdefault/equivalent command/statement)</i>	
	OR (ii) (b) Write a single statement to delete all the elements from D1.	

Ans	(ii) (b) <code>D1.clear()</code> OR <code>D1={}</code> OR <code>D1=dict()</code>	
	(1 mark for writing the correct statement) OR (½ mark for mentioning the method or function)	
25.	<p>What possible output(s) from the given options will NOT be displayed when the following code is executed ? Also, mention, for how many iterations the <code>for</code> loop in the given code will run ?</p> <pre>import random a = [1,2,3,4,5,6] for i in range(4): j=random.randrange(i,5) print(a[j],end='-') print()</pre> <p>Options :</p> <p>(A) 3-4-5-4- (B) 2-2-4-5- (C) 4-3-3-5- (D) 5-1-2-4-</p>	2
Ans	(D) 5-1-2-4- The for loop will run for 4 iterations.	
	(1 mark for writing <u>each</u> correct answer)	
26.	<p>The function given below is written to accept a string <code>s</code> as a parameter and return the number of vowels appearing in the string. The code has certain errors. Observe the code carefully and rewrite it after removing all the logical and syntax errors. Underline all the corrections made.</p> <pre>def CountVowels(s): c=0 for ch in range(s): if 'aeiouAEIOU' in ch: c+=1 return(ch)</pre>	2
Ans	<pre>def CountVowels(s): c=0 for ch in s: if <u>ch</u> in 'aeiouAEIOU': <u>c+=1</u> #OR c=c+1 <u>return(c)</u></pre> <p>OR</p> <pre>def CountVowels(s): c=0</pre> <p>#Correction-1 #Correction-2 #Correction-3 #Correction-4</p>	

	<pre> for ch in range(len(s)): if s[ch] in 'aeiouAEIOU': c=c+1 return c </pre>	#Correction-1 #Correction-2 #Correction-3 #Correction-4	
	<p><i>(½ mark for each correction)</i></p> <p>OR</p> <p><i>(Full 2 mark for writing the corrected code)</i></p> <p>OR</p> <p><i>(Total 1 mark for identification of all/any three errors without correction)</i></p>		
27.	<p>Ms. Zoya is a Production Manager in a factory which packages mineral water. She decides to create a table in a database to keep track of the stock present in the factory. Each record of the table will have the following fields :</p> <p>W_Code - Code of the item (type - CHAR (5)) W_Description - Description of the item (type - VARCHAR (20)) B_Qty - Balance quantity of the item (type - INTEGER) U_Price - Unit Price of the item (type - FLOAT) The name of the table is W_STOCK.</p>		2
	<p>(i) (a) Write an SQL command to create the above table (W_Code should be the primary key).</p>		
Ans	<p>(i) (a) CREATE TABLE W_STOCK (W_Code CHAR(5) PRIMARY KEY, W_Description VARCHAR (20), B_Qty INTEGER, #OR B_Qty INT/B_Qty DECIMAL(4) U_Price FLOAT);#OR U_Price FLOAT(7,2) #OR U_Price DECIMAL(7,2)</p> <p>OR</p> <p>Any other correct answer</p>		
	<p><i>(½ mark for correct command CREATE TABLE)</i> <i>(½ mark for correctly mentioning all the columns and their respective attributes)</i></p>		
	<p>OR</p> <p>(i) (b) Can U_Price be the primary key of the above table? Justify your answer.</p>		
Ans	<p>(i) (b) No, U_Price cannot be the primary key because it may contain duplicate and Null values.</p>		
	<p><i>(½ mark for writing 'No')</i> <i>(½ mark for correct justification)</i></p>		
	<p>(ii) (a) Assuming that the table W_STOCK is already created, write an SQL command to add an attribute E_Date (of DATE type) to the table.</p>		
Ans	<p>(ii) (a) ALTER TABLE W_STOCK ADD COLUMN E_Date DATE; OR ALTER TABLE W_STOCK ADD E_Date DATE;</p>		

	(½ mark for correct command ALTER TABLE) (½ mark for correctly adding column using ADD)	
	OR (ii) (b) Assuming that the table W_STOCK is already created, write an SQL command to remove the column B_Qty from the table.	
Ans	(ii) (b) ALTER TABLE W_STOCK DROP COLUMN B_Qty; OR ALTER TABLE W_STOCK DROP B_Qty;	
	(½ mark for correct command ALTER TABLE) (½ mark for correctly deleting column using DROP)	
28.	(a) List one advantage and one disadvantage of Bus topology.	2
Ans	(a) Advantages : <ul style="list-style-type: none"> • Cost-effective: As it requires less cable. • Easy to install • Easy to extend for small networks. Disadvantages : <ul style="list-style-type: none"> • Failure of the main backbone brings down the entire network. • Fault isolation is difficult. • Not suitable for large networks • Data collisions are frequent when many devices are connected. • Network speed slows down with heavy traffic. • Security is low as all devices can access transmitted data. 	
	(1 mark for writing any one correct advantage) (1 mark for writing any one correct disadvantage)	
	OR (b) What is protocol in the context of computer networks? Which protocol is used to transmit hypertext across the web?	
Ans	(b) A protocol is a set of rules that need to be followed by the communicating devices in order to have successful and reliable data communication. The protocol used to transmit hypertext across the web is Hypertext Transfer Protocol (HTTP)	
	(1 mark for correctly defining protocol) (1 mark for writing Hypertext Transfer Protocol or HTTP or HTTPS , any one)	

SECTION C		(3x3=9)
29.	(a) Write a Python function that counts and returns the number of digits appearing in the text file " Space.txt ". For example, if the file contains :	3

	<p>Space exploration has unlocked incredible advancements in technology and science. Since the first moon landing in 1969, space agencies have sent probes to Mars, Jupiter and beyond. The ISS, orbiting Earth at about 400 km, serves as a hub for research. With missions planned for 2030, humanity's cosmic journey continues!</p> <p>Then the function should return 11.</p>	
Ans	<p>(a)</p> <pre>def CountDigits(): with open("Space.txt",'r') as F: Data=F.read() C=0 for CH in Data: if CH.isdigit(): # OR if CH in '0123456789' C+=1 # OR if CH >= '0' and CH <= '9' return C</pre> <p>OR</p> <pre>def CountDigits(): F = open("Space.txt") All=F.readlines() C=0 for Line in All: for CH in Line: if CH.isdigit(): # OR if CH in '0123456789' C+=1 # OR if CH >= '0' and CH <= '9' F.close()</pre> <p>OR</p> <p>Any other equivalent correct code</p>	
	<p><i>(½ mark for opening the file in default/correct mode)</i> <i>(½ mark for correct reading or similar operation)</i> <i>(½ mark for correct iteration)</i> <i>(½ mark for correctly checking the condition)</i> <i>(½ mark for initializing and incrementing the counter correctly)</i> <i>(½ mark for returning the count)</i></p>	
	OR	
	<p>(b) Write a Python function that displays the words in which the lowercase letter 'e' appears at least twice in the text file 'Space.txt'. For example, if the file contains :</p> <p>Space exploration has unlocked incredible advancements in technology and science. Since the first moon landing in 1969, space agencies have sent probes to Mars, Jupiter and beyond. The ISS, orbiting Earth at about 400 km, serves as a hub for research. With missions</p>	

	<p>planned for 2030, humanity's cosmic journey continues!</p> <p>Then the function should display: incredible advancements science. agencies serves research.</p>	
Ans	<p>(b)</p> <pre>def showWords(): with open("Space.txt",'r') as F: All=F.read() Words=All.split() for word in Words: if word.count('e')>=2: print(word, end=' ') OR def showWords(): F = open("Space.txt") #'r'/'rt' is optional All=F.readlines() for L in All: Words=L.split() for Word in Words : C=Word.count('e') if C>=2: print(Word, end= ' ') F.close() OR Any other equivalent correct code</pre>	
	<p><i>(½ mark for opening the file in default/correct mode)</i> <i>(½ mark for correct reading or similar operation)</i> <i>(½ mark for correct iteration)</i> <i>(1 mark for correctly checking the condition)</i> <i>(½ mark for displaying the result)</i></p>	
30.	<p>(a) A stack named FruitStack, implemented using list, contains records of some fruits. Each record is represented as a dictionary with keys 'Name', 'Origin', 'Price' and 'Expiry'. A sample record is given here:</p> <pre>{'Name': 'Apple', 'Origin': 'France', 'Price': 120, 'Expiry': '12-08-2025'}</pre> <p>Write the following user-defined functions in Python to perform the specified operations on FruitStack :</p> <p>(i) push_fruit(FruitStack, Fruit) : This function takes the stack FruitStack and a new record Fruit as arguments and pushes the record stored in Fruit onto FruitStack if the Price is less than 100.</p>	<p>3x1 =3</p>

	<p>(ii) <code>pop_fruit(FruitStack)</code> : This function pops the topmost record from the stack and returns it. If the stack is already empty, the function should display "UNDERFLOW" .</p> <p>(iii) <code>display(FruitStack)</code> : This function displays all the elements of the stack starting from the topmost element. If the stack is empty, the function should display 'EMPTY STACK' .</p>											
Ans	<table><tr><td>(i)</td><td><pre>def push_fruit(FruitStack, Fruit): if Fruit['Price']<100: FruitStack.append(Fruit) OR def push_fruit(FruitStack, Fruit): #Option 2(i) if Fruit['Price']<100: FruitStack.insert(0,Fruit) OR Any similar, equivalent, correct code</pre></td></tr><tr><td></td><td><p><i>(½ mark for correctly checking the condition)</i> <i>(½ mark for correctly pushing Fruit)</i></p></td></tr><tr><td>(ii)</td><td><pre>def pop_fruit(FruitStack): if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('UNDERFLOW') else: return FruitStack.pop() OR def pop_fruit(FruitStack): #Option 2(ii) if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('UNDERFLOW') else: return FruitStack.pop(0) OR Any similar, equivalent, correct code</pre></td></tr><tr><td></td><td><p><i>(½ mark for correctly checking and displaying 'Underflow')</i> <i>(½ mark for correctly popping and returning the element)</i></p></td></tr><tr><td>(iii)</td><td><pre>def display(FruitStack): if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('EMPTY STACK') else: for ele in FruitStack[::-1]: print(ele) OR</pre></td></tr></table>	(i)	<pre>def push_fruit(FruitStack, Fruit): if Fruit['Price']<100: FruitStack.append(Fruit) OR def push_fruit(FruitStack, Fruit): #Option 2(i) if Fruit['Price']<100: FruitStack.insert(0,Fruit) OR Any similar, equivalent, correct code</pre>		<p><i>(½ mark for correctly checking the condition)</i> <i>(½ mark for correctly pushing Fruit)</i></p>	(ii)	<pre>def pop_fruit(FruitStack): if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('UNDERFLOW') else: return FruitStack.pop() OR def pop_fruit(FruitStack): #Option 2(ii) if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('UNDERFLOW') else: return FruitStack.pop(0) OR Any similar, equivalent, correct code</pre>		<p><i>(½ mark for correctly checking and displaying 'Underflow')</i> <i>(½ mark for correctly popping and returning the element)</i></p>	(iii)	<pre>def display(FruitStack): if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('EMPTY STACK') else: for ele in FruitStack[::-1]: print(ele) OR</pre>	
(i)	<pre>def push_fruit(FruitStack, Fruit): if Fruit['Price']<100: FruitStack.append(Fruit) OR def push_fruit(FruitStack, Fruit): #Option 2(i) if Fruit['Price']<100: FruitStack.insert(0,Fruit) OR Any similar, equivalent, correct code</pre>											
	<p><i>(½ mark for correctly checking the condition)</i> <i>(½ mark for correctly pushing Fruit)</i></p>											
(ii)	<pre>def pop_fruit(FruitStack): if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('UNDERFLOW') else: return FruitStack.pop() OR def pop_fruit(FruitStack): #Option 2(ii) if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('UNDERFLOW') else: return FruitStack.pop(0) OR Any similar, equivalent, correct code</pre>											
	<p><i>(½ mark for correctly checking and displaying 'Underflow')</i> <i>(½ mark for correctly popping and returning the element)</i></p>											
(iii)	<pre>def display(FruitStack): if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('EMPTY STACK') else: for ele in FruitStack[::-1]: print(ele) OR</pre>											

	<pre>def display(FruitStack): #Option 2(iii) if FruitStack==[]: # OR if not FruitStack: # OR if len(FruitStack)==0: print('EMPTY STACK') else: for ele in FruitStack: print(ele)</pre> <p>OR Any similar, equivalent, correct code</p>	
	<p><i>(½ mark for correctly checking the whether the stack is empty)</i> <i>(½ mark for correctly displaying the stack)</i></p>	
	<p style="text-align: center;">OR</p> <p>(b) Write a Python program to accept 10 integers from the user. If the entered number is a three digit even integer, push it onto a stack. After all inputs are taken, pop all the three-digit even integers from the stack and display them. For example, if the user enters 12, 31, 320, 457, 6, 92, 924, 220, 1, 218, then the stack should contain : 320, 924, 220, 218</p> <p>and the output of the program should be : 218 220 924 320</p>	
Ans	<p>(b) <code>Stack=[] #Stack</code> <code>for C in range(10):</code> <code>Num=int(input("Integer:"))</code> <code>if Num>=100 and Num<=999 and Num%2==0:</code> <code>#if len(str(Num))==3 and Num%2==0:</code> <code>Stack.append(Num)</code> <code>while Stack:</code> <code>print(Stack.pop(), end=' ')</code></p> <p>OR Any similar, equivalent, correct code with/without user defined function</p>	
	<p><i>(½ mark for correctly declaring/defining the stack)</i> <i>(½ mark for correctly entering/inputting the numbers in a loop)</i> <i>(½ mark for correctly checking the condition)</i> <i>(½ mark for pushing the correct number)</i> <i>(½ mark for the correct loop)</i> <i>(½ mark for correctly popping and displaying the stack elements)</i></p>	
31.	<p>(a) Write the output of the following code :</p> <pre>def Exam2026(given) : new=[] for ch in given [1:-1]: if ch.isupper(): new.reverse() elif ch not in new: new.append(ch) elif ch in new:</pre>	3

	<pre> new.pop() print(new) Exam2026("Gold-24Medals") </pre>	
Ans	(a) ['4', '2', '-', 'd', '1', 'o']	
	(½ Mark for each correct letter/digit/sign in the right order) (Deduct ½ mark if the container list is not correctly shown)	
	<p style="text-align: center;">OR</p> <p>(b) Write the output of the following code</p> <pre> def Exam2026(given): new = 0 while given: if new % 2: new += given % 10 else: new += given % 5 print(new, end = '-') given //= 10 Exam2026(123456) </pre>	
Ans	(b) 1-6-10-13-15-16-	
	(½ mark for each correct number in the right order) (Deduct ½ mark if the dashes (-) are not shown or incorrectly shown)	

SECTION D					(4x4=16)																																			
32.	Abhishek has created a table, named STOCK , with a set of records to maintain the data of packaged milk in his shop. After creating the table, he entered the data and the table looked as follows :				4																																			
	<table><tr><td>Code</td><td>Type</td><td>Volume</td><td>Qty</td><td>Price</td></tr><tr><td>AF0.5</td><td>F</td><td>0.5</td><td>300</td><td>38.00</td></tr><tr><td>MF0.5</td><td>F</td><td>0.5</td><td>250</td><td>36.50</td></tr><tr><td>MT1.0</td><td>T</td><td>1.0</td><td>150</td><td>64.00</td></tr><tr><td>AT1.0</td><td>T</td><td>1.0</td><td>100</td><td>66.00</td></tr><tr><td>PD1.0</td><td>D</td><td>1.0</td><td>50</td><td>52.00</td></tr><tr><td>PT0.5</td><td>T</td><td>0.5</td><td>78</td><td>30.00</td></tr></table>	Code	Type	Volume	Qty	Price	AF0.5	F	0.5	300	38.00	MF0.5	F	0.5	250	36.50	MT1.0	T	1.0	150	64.00	AT1.0	T	1.0	100	66.00	PD1.0	D	1.0	50	52.00	PT0.5	T	0.5	78	30.00				
Code	Type	Volume	Qty	Price																																				
AF0.5	F	0.5	300	38.00																																				
MF0.5	F	0.5	250	36.50																																				
MT1.0	T	1.0	150	64.00																																				
AT1.0	T	1.0	100	66.00																																				
PD1.0	D	1.0	50	52.00																																				
PT0.5	T	0.5	78	30.00																																				
	(a) Based on the data given above, write the SQL queries for the following tasks:																																							
	(i) To display Type and the maximum Price for each Type of milk.																																							
Ans	(a) (i) SELECT TYPE, MAX(PRICE) FROM STOCK GROUP BY TYPE;																																							

	(½ Mark for <i>SELECT TYPE, MAX(PRICE) FROM STOCK</i>) (½ Mark for <i>GROUP BY TYPE;</i>)	
	(ii) For each record, increase the Price by 0.5 where Type is 'F'.	
Ans	(ii) UPDATE STOCK SET PRICE=PRICE+0.5 WHERE TYPE='F';	
	(½ Mark for <i>UPDATE STOCK</i>) (½ Mark for <i>SET PRICE=PRICE+0.5 WHERE TYPE='F'</i>)	
	(iii) To display the total value of the stock (total of Qty × Price).	
Ans	(iii) SELECT SUM(QTY*PRICE) FROM STOCK;	
	(½ Mark for correct <i>SELECT ...FROM...</i>) (½ Mark for <i>SUM(QTY*PRICE)</i>)	
	(iv) To display the details of all records where Code starts with 'A'.	
Ans	(iv) SELECT * FROM STOCK WHERE CODE LIKE 'A%'; OR WHERE CODE LIKE 'A_____'	
	(½ Mark for correct <i>SELECT ...FROM...</i>) (½ Mark for for correct condition)	
	OR	
	(b) Considering the table STOCK as given above, write the output on execution of the following queries :	
	(i) SELECT Volume, Qty, Price FROM STOCK WHERE Type IN ('F','D');	
Ans	(i) VOLUME QTY PRICE 0.5 300 38.00 0.5 250 36.50 1.0 50 52.00	
	(½ Mark for any 2 rows with correct values) (½ Mark for remaining row with correct values) Note: Ignore the output header	
	(ii) SELECT Code, Qty FROM STOCK WHERE Price BETWEEN 30 AND 50;	
Ans	(ii) CODE QTY AF0.5 300 MF0.5 250 PT0.5 78	
	(½ Mark for any 2 rows with correct values)	

	(½ Mark for remaining row with correct values) <i>Note: Ignore the output header</i>	
	(iii) <code>SELECT DISTINCT Type FROM STOCK;</code>	
Ans	(iii) <code>DISTINCT TYPE</code> <code>F</code> <code>T</code> <code>D</code>	
	(½ Mark for any 2 rows with correct values) (½ Mark for remaining row with correct value) <i>Note: Ignore the output header</i>	
	(iv) <code>SELECT Volume, count(*) FROM STOCK</code> <code>GROUP BY Volume;</code>	
Ans	(iv) <code>VOLUME COUNT(*)</code> <code>0.5 3</code> <code>1.0 3</code>	
	(½ Mark for one row with correct values) (½ Mark for remaining row with correct values)	
33.	<p>A csv file "States.csv" contains some data about all the states of India. Each record of the file contains the following data :</p> <ul style="list-style-type: none"> • Name of the State • Capital of the State • Population of the State • Official Language of the State <p>For example, a sample record in the file is : ['Andhra Pradesh', 'Amaravati', 52221000, 'Telugu']</p> <p>Write a Python program which reads the data from this file and appends all those records where population is more than 10000000 into another csv file 'More.csv'.</p> <p>Note : "States.csv" also contains the Header row. The Header row should NOT be copied to "More.csv".</p>	4
Ans	<pre>import csv with open('States.csv') as F1 : with open('More.csv','a',newline='') as F2: # file mode 'w' is also acceptable R=csv.reader(F1) W=csv.writer(F2) RECS=list(R) for rec in RECS[1:]:#skipping the Header row if int(rec[2])>10000000: W.writerow(rec)</pre> <p>OR</p> <pre>import csv F1=open('States.csv') F2=open('More.csv','a') # mode 'w' is also acceptable</pre>	

	<pre>R=csv.reader(F1) W=csv.writer(F2) RECS=list(R) for rec in RECS[1:]: #skipping the Header row if int(rec[2])>10000000: W.writerow(rec) F1.close() F2.close()</pre> <p>OR</p> <pre>import csv F1=open("States.csv","r") R=list(csv.reader(F1)) Data=[] for rec in R[1:]: #skipping the Header row if int(rec[2])>10000000: Data.append(rec) F1.close() F2=open("More.csv","w") W=csv.writer(F2) W.writerows(Data) F2.close()</pre> <p>OR</p> <p>Any similar, equivalent, correct code</p>																						
	<p><i>(½ mark for correctly opening "States. csv")</i> <i>(½ mark for correctly opening "More. csv")</i> <i>(½ mark for correctly creating the reader object)</i> <i>(½ mark for correctly creating the writer object)</i> <i>(½ mark for correctly skipping the header row)</i> <i>(½ mark for iteration of records)</i> <i>(½ mark for correctly checking the condition)</i> <i>(½ mark for correctly writing the record in "More. csv")</i></p> <p>Note:</p> <ul style="list-style-type: none"><i>Ignore newline clause , Ignore import csv, Ignore close() method(s)</i>																						
34.	<p>Assume that you are the Manager of the Loans department of a Finance House. To keep track of the loans you have created two tables : CUSTOMERS and LOANS . The sample data in these tables is given below :</p> <p style="text-align: center;">Table : CUSTOMERS</p> <table><tr><th>C_ID</th><th>C_Name</th><th>Phone</th></tr><tr><td>00001</td><td>Raj Malhotra</td><td>1234567890</td></tr><tr><td>00003</td><td>David Xavier</td><td>3456789012</td></tr><tr><td>00004</td><td>Damini Iyer</td><td>3156789012</td></tr><tr><td>00008</td><td>Abdul</td><td>2345678901</td></tr></table> <p style="text-align: center;">Table : LOANS</p> <table><tr><th>SNo</th><th>C_ID</th><th>L_Amt</th><th>L_Date</th><th>Terms</th><th>RoI</th></tr></table>	C_ID	C_Name	Phone	00001	Raj Malhotra	1234567890	00003	David Xavier	3456789012	00004	Damini Iyer	3156789012	00008	Abdul	2345678901	SNo	C_ID	L_Amt	L_Date	Terms	RoI	4x1 =4
C_ID	C_Name	Phone																					
00001	Raj Malhotra	1234567890																					
00003	David Xavier	3456789012																					
00004	Damini Iyer	3156789012																					
00008	Abdul	2345678901																					
SNo	C_ID	L_Amt	L_Date	Terms	RoI																		

	<table><tr><td>1</td><td>00003</td><td>200000</td><td>2025-12-06</td><td>60</td><td>7.80</td></tr><tr><td>2</td><td>00008</td><td>2500000</td><td>2023-08-09</td><td>60</td><td>9.00</td></tr><tr><td>3</td><td>00001</td><td>500000</td><td>2025-08-13</td><td>48</td><td>6.00</td></tr><tr><td>4</td><td>00003</td><td>300000</td><td>2026-12-07</td><td>36</td><td>8.00</td></tr><tr><td>5</td><td>00004</td><td>600000</td><td>2026-12-07</td><td>60</td><td>6.00</td></tr></table>	1	00003	200000	2025-12-06	60	7.80	2	00008	2500000	2023-08-09	60	9.00	3	00001	500000	2025-08-13	48	6.00	4	00003	300000	2026-12-07	36	8.00	5	00004	600000	2026-12-07	60	6.00	
1	00003	200000	2025-12-06	60	7.80																											
2	00008	2500000	2023-08-09	60	9.00																											
3	00001	500000	2025-08-13	48	6.00																											
4	00003	300000	2026-12-07	36	8.00																											
5	00004	600000	2026-12-07	60	6.00																											
	<p>Note : The tables may contain more records than shown here. The management of the Finance House needs certain reports from you. Write the queries to extract the following data to create the reports :</p>																															
	(i) Number of records from LOANS table where Rate of Interest (RoI) is above 7.0.																															
Ans	(i) SELECT COUNT(*) FROM LOANS WHERE RoI > 7.0;																															
	<p><i>(½ Mark for SELECT COUNT(*) FROM LOANS)</i> <i>(½ Mark for WHERE RoI > 7.0)</i></p>																															
	(ii) Names of the customers whose loan amount (L_Amt) is above 1000000.																															
	<p>(ii) SELECT C_Name FROM CUSTOMERS JOIN LOANS ON CUSTOMERS.C_ID = LOANS.C_ID WHERE L_Amt > 1000000;</p> <p>OR</p> <p>SELECT C_Name FROM CUSTOMERS, LOANS WHERE CUSTOMERS.C_ID = LOANS.C_ID AND L_Amt > 1000000;</p> <p>OR</p> <p>SELECT C_Name FROM CUSTOMERS NATURAL JOIN LOANS WHERE L_Amt > 1000000;</p> <p>OR</p> <p>SELECT C_Name FROM CUSTOMERS JOIN LOANS ON CUSTOMERS.C_ID = LOANS.C_ID WHERE L_Amt > 1000000 GROUP BY C_Name;</p> <p>OR</p> <p>SELECT C_Name FROM CUSTOMERS JOIN LOANS ON CUSTOMERS.C_ID = LOANS.C_ID GROUP BY C_Name HAVING SUM(L_Amt) > 1000000;</p> <p>OR</p> <p>Any other correct SQL Command</p>																															
	<p><i>(½ Mark for correct selection from both the tables)</i> <i>(½ Mark for correct uses of JOIN and WHERE clause)</i></p>																															

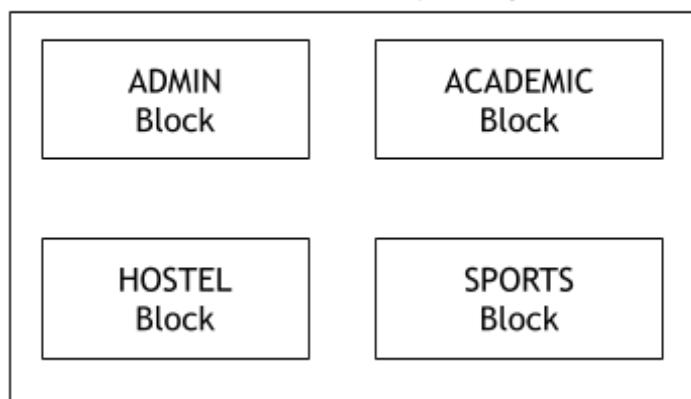
	(iii) C_ID, C_Name, and Terms of all those records where Loan Date (L_Date) is after 31 st December, 2024.	
	<p>(iii)</p> <pre>SELECT L.C_ID, C_NAME, TERMS FROM CUSTOMERS C, LOANS L WHERE C. C_ID = L.C_ID AND L_DATE > '2024-12-31';</pre> <p>OR</p> <pre>SELECT CUSTOMERS.C_ID, C_Name, Terms FROM CUSTOMERS JOIN LOANS ON CUSTOMERS.C_ID = LOANS.C_ID WHERE L_Date > '2024-12-31';</pre> <p>OR</p> <pre>SELECT CUSTOMERS.C_ID, C_Name, Terms FROM CUSTOMERS, LOANS WHERE CUSTOMERS.C_ID = LOANS.C_ID AND L_Date > '2024-12-31';</pre> <p>OR</p> <pre>SELECT C.C_ID, C_NAME, TERMS FROM CUSTOMERS C NATURAL JOIN LOANS WHERE L_DATE > '2024-12-31';</pre> <p>OR</p> <pre>SELECT C.C_ID, C.C_Name, L.Terms FROM CUSTOMERS C, LOANS L WHERE C.C_ID = L.C_ID AND L.L_Date > '2024-12-31';</pre> <p>OR</p> <p>Any other correct SQL Command</p>	
	<p><i>(½ Mark for correct selection from both tables)</i></p> <p><i>(½ Mark for correct uses of JOIN and WHERE clause)</i></p>	
	(iv) (a) Details of all the loans in the descending order of RoI.	
	<p>(iv) (a)</p> <pre>SELECT * FROM LOANS ORDER BY RoI DESC;</pre> <p>OR</p> <p>Any other correct SQL Command</p>	
	<p><i>(½ Mark for correct SELECT ... FROM...)</i></p> <p><i>(½ Mark for correct use of ORDER BY ...)</i></p>	
	<p>OR</p> <p>(iv) (b) C_ID and average term for each C_ID from the LOANS table.</p>	
	<p>(iv) (b)</p> <pre>SELECT C_ID, AVG(TERMS) FROM LOANS GROUP BY C_ID;</pre> <p>OR</p> <p>Any other correct SQL Command</p>	

	<p><i>(½ Mark for correct SELECT Query with AVG or SUM/COUNT function)</i> <i>(½ Mark for correct use of GROUP BY)</i></p>	
35.	<p>Peter has created a table named Account in MySQL database, SCHOOL, having following structure :</p> <ul style="list-style-type: none"> • Stud_id – integer • Sname – string • Class – string • Fees – float <p>Help him in writing a Python program to display records of those students whose fees is less than 5000. Note the following to establish connectivity between Python and MySQL :</p> <ul style="list-style-type: none"> • Username – admin • Password – root • Host – localhost 	4
Ans	<pre>import pymysql as pm # OR import mysql.connector as pm DB = pm.connect(host='localhost',user='admin', \ password='root', database = 'SCHOOL')) CUR = DB.cursor() SQL = "SELECT * FROM Account WHERE Fees<5000" CUR.execute(SQL) Data=CUR.fetchall() for D in Data: print(D) DB.close()</pre> <p>OR</p> <pre>import pymysql as pm # OR import mysql.connector as pm DB = pm.connect(host='localhost',user='admin', \ password='root', database = 'SCHOOL')) CUR = DB.cursor() SQL = "SELECT * FROM Account WHERE Fees<5000" CUR.execute(SQL) for C in CUR: print(C) DB.close()</pre> <p>OR Any equivalent valid and correct code</p>	
	<p><i>(1 Mark for creating correct connectivity)</i> <i>(½ Mark for creating the cursor)</i> <i>(½ Mark for correct formation of Query)</i> <i>(½ Mark for correct execution of the query)</i> <i>(½ Mark for correctly fetching the data with/without using fetchall)</i> <i>(1 Mark for correctly displaying the data)</i> Note: <i>(½ Mark for importing correct module, if the marks allocated are less than 4)</i></p>	
SECTION E		(2x5=10)

36.	<p>NextStep is an organization which has a pool of resource persons to conduct training workshops on various topics related to ICT. The data of all its Resource Persons is stored in a binary file 'RESOURCES.DAT' using the following record structure (each record is a tuple) :</p> <p style="padding-left: 40px;">(R_ID, R_Name, R_Expertise, Charges)</p> <p>where :</p> <p>R_ID - Resource Person's ID (An integer)</p> <p>R_Name - Resource Person's Name (A string)</p> <p>R_Expertise - Area of expertise of the Resource Person</p> <p>Charges - Charges (in rupees) per hour to conduct a workshop</p> <p>For example, a record in the file is :</p> <p>(12, 'P. Velusami', 'Machine Learning', 5000)</p> <p>In this context, write the following user defined functions in Python :</p>	2+3=5
	<p>(i) Append() - To input the data of a Resource Person and write it in the file RESOURCES.DAT.</p>	
Ans	<p>(i)</p> <pre>import pickle def Append(): #Assuming independent tuples in file F=open("RESOURCES.DAT","ab") R_ID = int(input("Resource Person ID:")) R_Name = input("Resource Person Name:") R_Expertise = input("Area of Expertise:") Charges = int(input("Hourly Charges:")) Rec=(R_ID, R_Name, R_Expertise, Charges) #[R_ID, R_Name, R_Expertise, Charges] also valid pickle.dump (Rec, F) F.close()</pre> <p>OR</p> <pre>def Append(): #Assuming list of tuples in file with open("RESOURCES.DAT","rb+") as F: Rec=pickle.load(F) R_ID = int(input("Resource Person ID:")) R_Name = input("Resource Person Name:") R_Expertise = input("Area of Expertise:") Charges = int(input("Hourly Charges:")) Rec.append((R_ID, R_Name, R_Expertise, Charges)) F.seek(0) pickle.dump (Rec, F)</pre> <p>OR</p> <p># Also consider a code, which reads from file using rb, and writes the # appended content of records by reopening the same file in wb mode or # dumping the content in a new file</p> <p>OR</p> <p>Any other equivalent correct code</p>	
	<p>(i) <i>(½ Mark for opening the file in correct mode)</i></p>	

	<p><i>(½ Mark for inputting the details of the record)</i> <i>(½ Mark for formation of the tuple or list of the record)</i> <i>(½ Mark for correctly dumping the tupe/list)</i></p>	
	(ii) Update () - To increase the Charges of each resource person by 500.	
	<p>(ii) <code>import pickle</code> <code>def Update(): #Assuming independent tuples in file</code> <code>F=open("RESOURCES.DAT","rb+")</code> <code>try:</code> <code> while True:</code> <code> Pos=F.tell()</code> <code> Rec=pickle.load(F)</code> <code> Newrec=list(Rec)</code> <code> Newrec[3]+=500</code> <code> F.seek(Pos)</code> <code> pickle.dump(tuple(Newrec),F)</code> <code>except:</code> <code> F.close()</code></p> <p>OR</p> <p><code>import pickle #Assuming list of tuples in file</code> <code>def Update():</code> <code>with open("RESOURCES.DAT","rb+") as F:</code> <code> Rec = pickle.load(F)</code> <code> for I in range(len(Rec)):</code> <code> Rec[I]=list(Rec[I])</code> <code> Rec[I][3]+=500</code> <code> F.seek(0)</code> <code> pickle.dump(Rec,F)</code></p> <p>OR</p> <p># Also consider a code, which reads from file using rb, and writes the # updated record by reopening the same file in wb mode or dumping the # content in a new file</p> <p>OR</p> <p>Any other equivalent correct code</p>	
	<p>(ii) <i>(1 Mark for opening the file in correct modes)</i> <i>(½ Mark for reading/loading data correctly)</i> <i>(½ Mark for correct iteration)</i> <i>(½ Mark for incrementing the specified data correctly)</i> <i>(½ Mark for writing/dumping modified data)</i></p>	
37.	Sanjeevani is a big group of educational institutions with its head office in Hyderabad. It is planning to set up a new University in Amritsar. The Amritsar University Campus will have four block/buildings - ADMIN, ACADEMIC, HOSTEL, SPORTS. 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 in mind the distances between various blocks/buildings and other given parameters.	5x1 =5

Amritsar University Campus



Block to Block distances (in Mtrs) :

FROM	TO	DISTANCE
ADMIN	ACADEMIC	60 M
ADMIN	HOSTEL	160 M
ADMIN	SPORTS	80 M
ACADEMIC	HOSTEL	40 M
ACADEMIC	SPORTS	120 M
HOSTEL	SPORTS	150 M

Distance of Hyderabad Head Office from Amritsar University Campus = 2000 km

Number of computers in each block is as follows :

ADMIN	25
ACADEMIC	600
HOSTEL	120
SPORTS	50

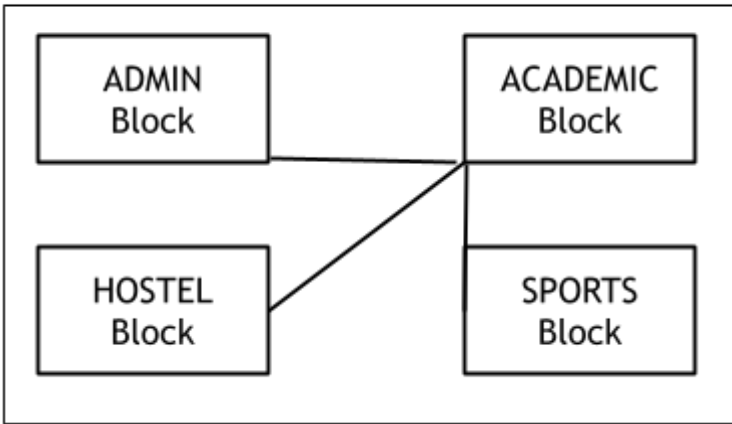
(i) Suggest the most appropriate location of the server inside the Amritsar University Campus. Justify your choice.

Ans (i) Academic Block as it has the maximum number of computers
OR
Academic Block as it requires minimum cable length
OR
Any other similar answer with valid justification

(1 mark for suggesting a block with valid justification)

(ii) Draw the cable layout to efficiently connect various blocks within the Amritsar University Campus.

Ans (ii)

	<p style="text-align: center;">Amritsar University Campus</p>  <p style="text-align: center;">OR Diagram shown as per the Minimum Distances</p>	
	(1 mark for drawing the correct cable layout)	
	(iii) Name any two wired media that can be used to connect various computers of a block inside Amritsar Campus.	
Ans	(iii) Twisted pair cable, Ethernet cable, Coaxial Cable, Optical Fiber Cable (any two)	
	(½ mark each for writing any two correct wired media names)	
	(iv) For the academic purpose, the University will provide its own 24×7 FM channel within the University Campus. Which communication medium, out of the following, is used by FM ? (A) Radio Waves (B) Micro Waves (C) Infrared Waves	
Ans	(iv) (A) Radio waves	
	(1 Mark for writing the correct option)	
	(v) (a) The students will be attending a lot of online academic sessions and workshops. These will involve audio-visual communication. Write the full name of the protocol which will be used for such a communication through the internet.	
Ans	(v) (a) Voice over Internet Protocol	
	<p>(a) (1 Mark for writing the Voice Over Internet Protocol)</p> <p>OR</p> <p>(½ Mark for writing the VoIP)</p>	
	<p style="text-align: center;">OR</p> <p>(b) Where should a repeater be installed in Amritsar University campus to boost the signal between blocks? Justify your answer.</p>	
Ans	(b) Between Academic and Sports block because distance is more than 100m.	
	(1 Mark for writing the correct answer)	