

Question Paper ID: TN/25/CS/15012025

No. of Printed Pages: 8

பதிவு எண்
Register Number

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12TH MODEL PUBLIC EXAMINATION QUESTION PAPER – 2025

மேல்நிலை இரண்டாம் ஆண்டு மாதிரி பொதுத் தேர்வு வினாத்தாள் – 2025

PART – III**கணினி அறிவியல் / COMPUTER SCIENCE**

(தமிழ் மற்றும் ஆங்கில வழி / Tamil & English Version)

கால அளவு : 3.00 மணி நேரம்]

[மொத்த மதிப்பெண்கள் : 70

Time Allowed : 3.00 Hours]

[Maximum Marks : 70

- அறிவுரைகள் :** (1) அனைத்து வினாக்களும் சரியாகப் பதிவாகி உள்ளதா என்பதனைச் சரிபார்த்துக் கொள்ளவும். அச்சுப்பதிவில் குறையிருப்பின் அறைக் கண்காணிப்பாளரிடம் உடனடியாகத் தெரிவிக்கவும்.
- (2) நீலம் அல்லது கருப்பு மையினை மட்டுமே எழுதுவதற்கும், அடிகோடிடுவதற்கும் பயன்படுத்த வேண்டும். படங்கள் வரைவதற்கு பென்சில் பயன்படுத்தவும்.

- Instructions :** (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- (2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

பகுதி - I / PART – I

- குறிப்பு :** (i) அனைத்து வினாக்களுக்கும் விடையளிக்கவும். **15 x 1 = 15**
- (ii) கொடுக்கப்பட்ட நான்கு விடைகளில் மிகவும் ஏற்புடைய விடையினை தேர்ந்தெடுத்து குறியீட்டுடன் விடையினையும் சேர்த்து எழுதவும்.

- Note :** (i) Answer **all** the questions.
- (ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. பின்வரும் எது ஒரு பொருள் செய்ய வேண்டியதை தீர்மானிக்கிறது?

- (அ) இயக்க அமைப்பு (ஆ) நிரல் பெயர்ப்பி
(இ) இடைமுகம் (ஈ) தொகுப்பான்

Which of the following defines what an object can do?

- (a) Operating System (b) Compiler
(c) Interface (d) Interpreter

2. இரு மதிப்புகளை ஒன்றாக இணைக்கும் முறையை என்று அழைக்கிறோம்.

- (அ) Pair (ஆ) Triplet (இ) Single (ஈ) Quadrat

Bundling two values together into one can be considered as

- (a) Pair (b) Triplet (c) Single (d) Quadrat

3. இயங்கு நிரலாக்கத்தில், ஏற்கனவே கணக்கீடு செய்த மதிப்புகளை சேமிக்கு யுத்தியை இவ்வாறு அழைக்கலாம்.

- (அ) மதிப்பை சேமிக்கும் பண்பு (ஆ) மதிப்பை சேகரிக்கும் பண்பு
(இ) நினைவிருத்தல் (ஈ) படமிடல்

In dynamic programming, the technique of storing the previously calculated values is called?

- (a) Saving value property (b) Storing value property
(c) Memoization (d) Mapping

4. if கூற்றின் நிபந்தனை பின்வரும் எந்த வடிவில் இருக்க வேண்டும்

- (அ) கணித அல்லது ஒப்பீட்டுக் கோவைகள்
(ஆ) கணித அல்லது தருக்கக் கோவைகள்
(இ) ஒப்பீட்டு அல்லது தருக்கக் கோவைகள்
(ஈ) கணித கோவைகள்

The condition in the if statement should be in the form of

- (a) Arithmetic or Relational expression
(b) Arithmetic or Logical expression
(c) Relational or Logical expression
(d) Arithmetic

5. கொடுக்கப்பட்ட பொருளின் தரவினவ வகையைத் திருப்பி அனுப்பும் செயல்பாடு எது?

- (அ) type() (ஆ) id() (இ) min() (ஈ) max()

Which function returns the type of object for the given single object?

- (a) type() (b) id() (c) min() (d) max()

6. பின்வருவனவற்றுள் எது சரங்களை இணைக்க பயன்படும் செயற்குறியாகும்?

- (அ) += (ஆ) -= (இ) + (ஈ) -

Which operator is used to concatenate string in Python?

- (a) += (b) -= (c) + (d) -

7. பைத்தானில் **type()** செயற்குறியின் பயன் என்ன?

- (அ) Tuple உருவாக்க
(ஆ) Tuple உள்ள உறுப்புகளின் வகையைக் கண்டறிய
(இ) பைத்தான் பொருளின் தரவினத்தை கண்டறிய
(ஈ) பட்டியலை உருவாக்க

What is the use of **type()** function in Python?

- (a) To create a Tuple
(b) To know the type of an element in tuple
(c) To know the data type of python object
(d) To create a list

8. பைத்தான், Dictionary-ல் திறவுகோல்கள் எதனால் குறிப்பிடப்படுகின்றன

- (அ) = (ஆ) ; (இ) + (ஈ) :

The keys in Python, dictionary is specified by

- (a) = (b) ; (c) + (d) :

9. எந்த செயற்குறு பெயரில்லா செயற்குறு என்று அழைக்கப்படுகிறது?

- (அ) லாம்ப்டா (ஆ) தற்குழற்சி (இ) செயற்குறு (ஈ) வரையறை

Which function is called anonymous function?

- (a) Lambda (b) Recursion (c) Function (d) Define

10. பின்வருவனவற்றுள் எந்த இனக்குழு அறிவிப்பு சரியானது?

- (அ) class class_name (ஆ) class class_name<>
 (இ) class class_name: (ஈ) class class_name[]

Which of the following class declaring is correct?

- (a) class class_name (b) class class_name<>
 (c) class class_name: (d) class class_name[]

11. CRLF என்பதன் விரிவாக்கம்

- (அ) Control Return and Line Feed
 (ஆ) Carriage Return and Form Feed
 (இ) Control Router and Line Feed
 (ஈ) Carriage Return and Line Feed

The expansion of CRLF is

- (a) Control Return and Line Feed
 (b) Carriage Return and Form Feed
 (c) Control Router and Line Feed
 (d) Carriage Return and Line Feed

12. எத்தனை வகையான கட்டுப்பாடுகள் உள்ளன?

- (அ) 4 (ஆ) 3 (இ) 2 (ஈ) 1

How many types of Constraints?

- (a) 4 (b) 3 (c) 2 (d) 1

13. பின்வருவனவற்றுள் எது Scripting மொழி அல்ல?

- (அ) ஜாவாஸ்கிரிப்ட் (ஆ) PHP (இ) பெர்ல் (ஈ) HTML

Which of the following is not a scripting language?

- (a) JavaScript (b) PHP (c) Perl (d) HTML

14. பின்வரும் எந்த சிறப்பு சொல் நகல்களைத் தவிர்க்கும்?

- (அ) Distinct (ஆ) Remove (இ) Where (ஈ) GroupBy

Which of the following keyword helps to avoid the duplicate?

- (a) Distinct (b) Remove (c) Where (d) GroupBy

15. என்பது தகவல்களை, தரவு புள்ளிகளின் தொடரை நேர் கோட்டின் இணைப்பதன் மூலம் காட்டுகிறது.

- (அ) கோட்டு விளக்கப்படம் (ஆ) வட்ட விளக்கப்படம்
(இ) பட்டை விளக்கப்படம் (ஈ) அனைத்தும்

..... is a type of chart which displays information as a series of data points connected by straight line segments.

- (a) Line chart (b) Pie chart
(c) Bar chart (d) All the above

பகுதி - II / PART - II

குறிப்பு : எவையேனும் ஆறு வினாக்களுக்கு விடையளிக்கவும். 6 x 2 = 12
வினா எண் 24-க்கு கட்டாயமாக விடையளிக்கவும்.

Note : Answer **any six** questions. Question No. 24 is **compulsory**.

16. Namespaces சிறுகுறிப்பு வரைக?

What do you mean by Namespaces?

17. மேப்பிங் என்றால் என்ன?

What is Mapping?

18. வில்லைகள் பற்றி சிறு குறிப்பு வரைக.

Write short notes on Tokens.

19. சரம் என்றால் என்ன?

What is String?

20. செயற்கூறு என்றால் என்ன?

What is function?

21. காலியான (empty) சரத்துக்கு str.upper() பயன்படுத்தும் போது என்ன நிகழும்?

What will the str.upper() method return if applied to an empty string?

22. இனக்குழுவைப் பயன்படுத்தி முக்கோணத்தின் மூன்று பக்கங்களின் அளவை உள்ளீடாகப் பெற்று பரப்பளவைக் கண்டறியும் பைத்தான் நிரலை எழுதுக.

Write a program using class to accept three sides of a triangle and print its area.

23. SQL-இல் **GROUP BY** துணை நிலை கூற்று பயன்பாட்டைப் எடுத்துக்காட்டுடன் விளக்குக.

What is the purpose of the **GROUP BY** clause in SQL, and provide an example?

24. ஹிஸ்டோகிராம் மற்றும் பட்டை விளக்கப்படங்கள் - வேறுபடுத்துக.

Differences Between Histogram and Bar Graph

பகுதி - III / PART - III

குறிப்பு : எவையேனும் ஆறு வினாக்களுக்கு விடையளிக்கவும். $6 \times 3 = 18$
வினா எண் 33-க்கு கட்டாயமாக விடையளிக்கவும்.

Note : Answer **any six** questions. Question No. **33** is **compulsory**.

25. ஒரு செயற்கூறிக்கு வெளியே ஒரு மாறியை மாற்றினால் என்ன விளைவுகள் ஏற்படும்? ஒரு எடுத்துக்காட்டு தருக.

What happens if you modify a variable outside the function? Give an example.

26. விடுபடு வரிசை பற்றி எடுத்துக்காட்டுடன் குறிப்பு எழுதுக.

Write notes on Escape sequence with an example.

27. உள்ளிணைந்த வரையெல்லை என்பது என்ன?

Write a note on built-in scope.

28. ஒரு எண்ணின் வர்க்கம் (square) கண்டுபிடித்து அதன் விடையை காண்பிப்பதற்கான நிரல் நெறிமுறையை எழுதுக.

Design an algorithm to find square of the given number and display the result.

29. மும்ம செயற்குறியை எடுத்துக்காட்டுடன் எழுதுக.

Explain Ternary operator with examples.

30. len() செயற்கூறு எடுத்துக்காட்டுடன் குறிப்பு எழுதுக.

Write note on len() function with an example.

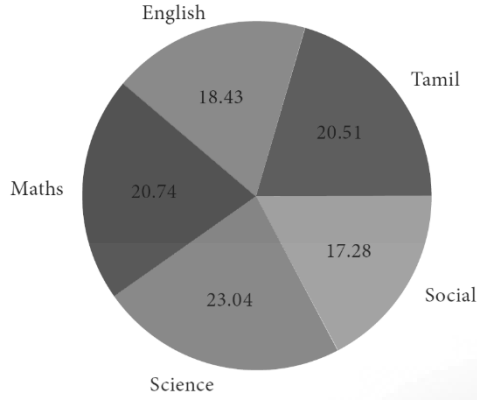
31. ஆக்கியை விளக்குவதற்கு ஒரு நிரலை எழுதுக.

Write a program to illustrate a Constructor

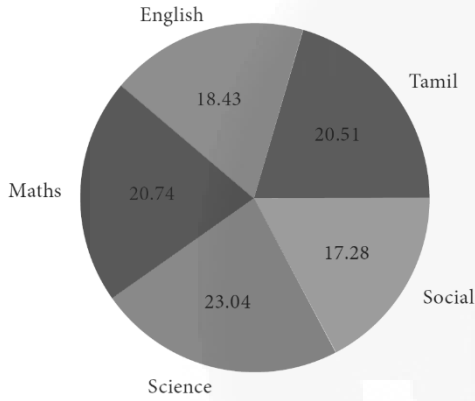
32. **fetchone()** மற்றும் **fetchmany()** – வேறுபடுத்துக.

Differentiate – **fetchone()** and **fetchmany()**.

33. பின்வரும் வட்ட வரைப்படத்தை வெளியீடாக பெற குறிமுறையை எழுதவும்.



Write the plot for the following pie chart output.



பகுதி - IV / PART - IV

குறிப்பு : அனைத்து வினாக்களுக்கு விடையளிக்கவும்.

5 x 5 = 25

Note : Answer **all** questions.

34. (அ) List என்றால் என்ன? ஏன் List, Pairs என்று அழைக்கப்படுகிறது. எடுத்துக்காட்டுடன் விவரி.

அல்லது

(ஆ) நெறிமுறை மற்றும் நிரலுக்கும் – வேறுபடுத்துக.

(a) What is a List? Why List can be called as Pairs. Explain with suitable example

OR

(b) Compare Algorithm and a Program.

35. (அ) செயற்குறிகள் மற்றும் அதன் வகைகளை விளக்குக.

அல்லது

(ஆ) தனிப்பயனாக்கம் பிரிப்பானுடன் கூடிய CSV கோப்பை எழுதுவதற்கான பைத்தான் நிரலை எழுதுக.

(a) Explain Operators and its types.

OR

(b) Write a Python program to write a CSV File with custom quotes.

36. (அ) பைத்தானில் உள்ள **find()** செயற்கூறு பற்றி எடுத்துக்காட்டுடன் விளக்குங்கள்

அல்லது

(ஆ) **remove()**, **pop()** மற்றும் **clear()** செயற்கூறுகளை வேறுபடுத்துக.

(a) Explain about the **find()** function in Python with example.

OR

(b) Compare **remove()**, **pop()** and **clear()** function in Python.

37. (அ) அனைத்து மூன்று இலக்க ஒற்றைப்படை எண்களை வெளியிடுவதற்கான நிரலை எழுதுக.

அல்லது

(ஆ) சரவடிவமைப்பு செயற்குறிகள் மற்றும் வடிவமைப்பு குறியீடுகளை விரிவாக விவரி.

(a) Write a program to display all 3-digit odd numbers.

OR

(b) Explain briefly about String Formatting Operators and Formatting characters in Python.

38. (அ) SQLite பற்றி விரிவாக எழுதவும், அதனை பயன்படுத்தும் படிநிலைகளை எழுதுக.

அல்லது

(ஆ) Matplotlib யை பயன்படுத்தும் pyplot வகைகளை விரிவாக விவரி.

(a) Write in brief about SQLite and the steps used to use it.

OR

(b) Explain in detail the types of pyplots using Matplotlib.

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12TH MODEL PUBLIC EXAMINATION QUESTION PAPER – 2025
KEY ANSWER - MARKING SCHEME

GENERAL INSTRUCTIONS:

1. If a student has given any answer which is different from one given in this marking scheme, but arrives with correct answer, should be given full credit with appropriate distribution.
2. In section I, award 1 mark for the correct option code and the corresponding answer. If one of them (Option or Answer) is wrong then award **ZERO** mark only.
3. In **PART II, PART III & PART IV** if the solution is correct then award full mark directly. The stage mark is essential only if the part of the solution is incorrect.
4. If a particular stage is wrong and if the student writes the appropriate formula, then suitable mark which is attached with that stage should be awarded for the formula. Mark should not be deducted for not writing the formula, if the student arrives at the correct answer.

Maximum Marks: 70

PART – I

Answer all the questions			15x1=15
Q. No	Option code	Key Answers	Marks Allotted
1.	(c)	Interface	1
2.	(a)	Pair	1
3.	(c)	Memoization	1
4.	(c)	Relational or Logical expression	1
5.	(a)	type()	1
6.	(c)	+	1
7.	(c)	To know the data type of python object	1
8.	(d)	:	1
9.	(a)	Lambda	1
10.	(c)	class class_name:	1
11.	(d)	Carriage Return and Line Feed	1
12.	(c)	2	1
13.	(d)	HTML	1
14.	(a)	Distinct	1
15.	(a)	Line chart	1

PART – II			
Answer any SIX questions. Question No. 24 is compulsory.			6x2=12
Q. No	Answers	Step Marks	Total Marks
16.	Containers for mapping names of variables to objects.	*	2
17.	<ul style="list-style-type: none"> ➤ The process of binding a variable name with an object is called mapping. ➤ = (equal to sign) is used in programming languages to map the variable and object. 	1 1	2
18.	<p>Python breaks each logical line into a sequence of elementary lexical components known as Tokens.</p> <p>The normal token types are</p> <ol style="list-style-type: none"> 1. Identifiers, 2. Keywords, 3. Operators, 4. Delimiters and 5. Literals. <p>Whitespace separation is necessary between tokens.</p>	1 1	2
19.	<ul style="list-style-type: none"> ➤ A string in Python is a data type used to handle sequences of Unicode characters, including letters, numbers, or symbols, enclosed within single, double, or triple quotes. ➤ Strings are immutable, meaning they cannot be altered once defined during program execution. 	1 1	2
20.	<ul style="list-style-type: none"> ➤ Functions must be defined to create and use specific functionality. Python provides many built-in functions (e.g., print()) and allows you to define your own functions. ➤ Function definition begins with the keyword def, followed by the function name and parentheses (). 	1 1	2
21.	Returns an empty string ('') as there are no characters to convert.		2

22.	<p>class Triangle:</p> <pre> def __init__(self, base, height): self.base = base self.height = height def calculate_area(self): # Area = (1/2) * base * height return 0.5 * self.base * self.height # Input the base and height of the triangle base = float(input("Enter the base of the triangle: ")) height = float(input("Enter the height of the triangle: ")) # Create a Triangle object and calculate the area triangle = Triangle(base, height) area = triangle.calculate_area() print(f"The area of the triangle is: {area:.2f}") </pre> <p>*Note: The implementation of the program may vary depending on the student's perspective and approach. As long as the logic and output are correct, full marks should be awarded.</p>	<p>½</p> <p>½</p> <p>½</p> <p>½</p>	2																		
23.	<p>GROUP BY is used in SQL to arrange identical data into groups. It is often used with aggregate functions (COUNT, MAX, MIN, SUM, AVG) to perform calculations on grouped data.</p> <p>Example:</p> <p>*Note: The implementation of the example may vary based on the dataset used. As long as the correct SQL query is written full marks should be awarded.</p> <pre> import sqlite3 connection = sqlite3.connect("Academy.db") cursor = connection.cursor() cursor.execute("SELECT gender, count(gender) FROM student GROUP BY gender") result = cursor.fetchall() print(*result, sep="\n") </pre>	<p>1</p> <p>1</p>	2																		
24.	<table border="1" data-bbox="304 1693 1142 1973"> <thead> <tr> <th>Aspect</th> <th>Histogram</th> <th>Bar Graph</th> </tr> </thead> <tbody> <tr> <td>Data Type</td> <td>Continuous</td> <td>Discrete</td> </tr> <tr> <td>Representation</td> <td>Frequency of data</td> <td>Comparison of categories</td> </tr> <tr> <td>Bar Spacing</td> <td>No gap between bars</td> <td>Gap between bars</td> </tr> <tr> <td>Order</td> <td>Cannot be rearranged</td> <td>Can be rearranged</td> </tr> <tr> <td>Width of Bars</td> <td>Varies</td> <td>Same width for all bars</td> </tr> </tbody> </table> <p>*Note: Any four differences with correct answer</p>	Aspect	Histogram	Bar Graph	Data Type	Continuous	Discrete	Representation	Frequency of data	Comparison of categories	Bar Spacing	No gap between bars	Gap between bars	Order	Cannot be rearranged	Can be rearranged	Width of Bars	Varies	Same width for all bars	*	2
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PART – III																											
Answer any SIX questions. Question No. 33 is compulsory.			6x3=18																								
Q. No	Answers	Step Marks	Total Marks																								
25.	<p>➤ When a variable is modified outside a function, it can affect the variable globally if it's a global variable.</p> <p>➤ In the provided example, y is updated by adding the value of x to it. If x is modified inside the function, the change will be reflected in the value of y.</p> <p>➤ Example:</p> <pre>let y := 0 // Initialize y with 0 int) inc (int) x // Function takes x as input y := y + x; // y is modified by adding x to it return (y) // Return the modified value of y</pre> <p>*Note: The answer and example may vary based on the student's perspective and approach. As long as the logic is correct and the result is as expected, full marks should be awarded.</p>	1 1 1	3																								
26.	<p>Escape Sequences:</p> <p>In Python strings, the backslash "\" is a special character, also called the "escape" character. It is used in representing certain whitespace characters: "\t" is a tab, "\n" is a newline, and "\r" is a carriage return.</p> <p>For example, to print the message "It's raining", the Python command is</p> <pre>>>> print ("It's raining")</pre> <p>It's raining</p> <p>Python supports the following escape sequence characters.</p> <table border="1"> <thead> <tr> <th>Escape sequence character</th> <th>Description</th> <th>Example</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>\\</td> <td>Backslash</td> <td>>>> print("\\test")</td> <td>\\test</td> </tr> <tr> <td>\'</td> <td>Single-quote</td> <td>>>> print("Doesn't")</td> <td>Doesn't</td> </tr> <tr> <td>\"</td> <td>Double-quote</td> <td>>>> print("\"Python\"")</td> <td>"Python"</td> </tr> <tr> <td>\n</td> <td>New line</td> <td>print("Python","\n","Lang..")</td> <td>Python Lang..</td> </tr> <tr> <td>\t</td> <td>Tab</td> <td>print("Python","\t","Lang..")</td> <td>Python Lang..</td> </tr> </tbody> </table>	Escape sequence character	Description	Example	Output	\\	Backslash	>>> print("\\test")	\\test	\'	Single-quote	>>> print("Doesn't")	Doesn't	\"	Double-quote	>>> print("\"Python\"")	"Python"	\n	New line	print("Python","\n","Lang..")	Python Lang..	\t	Tab	print("Python","\t","Lang..")	Python Lang..	1 2	3
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27.	<p>Built-in Scope:</p> <ol style="list-style-type: none"> The built-in scope has all the names that are pre-loaded into the program scope when we start the compiler or interpreter. Any variable or function which is defined in the modules of a programming language has Built-in or module scope. They are loaded as soon as the library files are imported to the program. 	2	3																								

	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>Entire program</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <p>Built in/module scope →</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <p>Disp():</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <p>Disp1():</p> <p>print a</p> </div> <p>Disp1()</p> <p>print a</p> </div> <p>Disp()</p> </div> </div> </div> <div style="width: 50%;"> <p>Library files associated with the software</p> </div>
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31.	<p>Program to illustrate Constructor:</p> <pre> class Sample: def __init__(self, num): print("Constructor of class Sample...") self.num=num print("The value is :", num) S=Sample(10) </pre> <p>Explanation:</p> <ul style="list-style-type: none"> ➤ The above class “Sample”, has only a constructor with one parameter named as num. ➤ When the constructor gets executed, first the print statement, prints the “Constructor of class Sample...”, then, the passing value to the constructor is assigned to instance variable self.num = num and finally it prints the value passed along with the given string. ➤ The above constructor gets executed automatically, when an object S is created with actual parameter 10. ➤ Thus, the Python display the following output. <p style="text-align: center;">Constructor of class Sample...</p> <p style="text-align: center;">The value is : 10</p> ➤ Class variable defined within constructor keep count of number of objects created with the class. 	2 1	3																					
32.	<p>fetchone() and fetchmany():</p> <table border="1" data-bbox="258 1263 1241 1827"> <thead> <tr> <th>Feature</th> <th>fetchone()</th> <th>fetchmany()</th> </tr> </thead> <tbody> <tr> <td>Functionality</td> <td>Fetches a single row from the result set.</td> <td>Fetches multiple rows from the result set.</td> </tr> <tr> <td>Return Type</td> <td>Returns a single tuple containing the row.</td> <td>Returns a list of tuples, each representing a row.</td> </tr> <tr> <td>Usage</td> <td>Used when you want to fetch one row at a time.</td> <td>Used when you want to fetch a specific number of rows.</td> </tr> <tr> <td>Default Fetch Size</td> <td>N/A (always fetches 1 row)</td> <td>Requires a parameter to specify how many rows to fetch.</td> </tr> <tr> <td>Common Scenario</td> <td>When iterating over rows one by one.</td> <td>When you need a batch of rows, not just one.</td> </tr> <tr> <td>Example</td> <td><code>cursor.fetchone()</code></td> <td><code>cursor.fetchmany(5)</code></td> </tr> </tbody> </table> <p>*Note: Any six differences with correct answer</p>	Feature	fetchone()	fetchmany()	Functionality	Fetches a single row from the result set.	Fetches multiple rows from the result set.	Return Type	Returns a single tuple containing the row.	Returns a list of tuples, each representing a row.	Usage	Used when you want to fetch one row at a time.	Used when you want to fetch a specific number of rows.	Default Fetch Size	N/A (always fetches 1 row)	Requires a parameter to specify how many rows to fetch.	Common Scenario	When iterating over rows one by one.	When you need a batch of rows, not just one.	Example	<code>cursor.fetchone()</code>	<code>cursor.fetchmany(5)</code>	*	3
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33.	<pre>import matplotlib.pyplot as plt sizes = [89, 80, 90, 100, 75] labels = ["Tamil", "English", "Maths", "Science", "Social"] plt.pie (sizes, labels = labels, autopct = "%.2f") plt.show()</pre>	3	3
-----	--	---	---

PART – IV

Answer all questions.

5x5=25

Q. No	Answers	Step Marks	Total Marks
34.	<p>(a)</p> <p>List:</p> <ul style="list-style-type: none"> ➤ List is constructed by placing expressions within square brackets separated by commas. Such an expression is called a list literal. List can store multiple values. Each value can be of any type and can even be another list. Example for List [10, 20]. ➤ The elements of a list can be accessed in two ways. The first way is via our familiar method of multiple assignment, which unpacks a list into its elements and binds each element to a different name. lst := [10, 20] x, y := lst ➤ In the above example x will become 10 and y will become 20. ➤ A second method for accessing the elements in a list is by the element selection operator. Unlike a list literal, a square brackets expression directly following another expression does not evaluate to a list value, but instead selects an element from the value of the preceding expression. lst[0] 10 lst[1] 20 ➤ In both the example mentioned above mathematically we can represent list similar to a set. lst[(0, 10), (1, 20)] - where <div style="text-align: center; margin: 10px 0;"> </div> <p><i>Any way of bundling two values together into one can be considered as a pair. Lists are a common method to do so. Therefore, List can be called as Pairs.</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	5

	<p>Representing Rational Numbers Using List</p> <pre> rational(n, d): return [n, d] numer(x): return x[0] denom(x): return x[1] </pre>	1	
OR			
	Algorithm	Program	
	Algorithm helps to solve a given problem logically and it can be contrasted with the program	Program is an expression of algorithm in a programming language	1
	Algorithm can be categorized based on their implementation methods, design techniques etc	Algorithm can be implemented by structured or object-oriented programming approach	1
(b)	There are no specific rules for algorithm writing but some guidelines should be followed.	Program should be written for the selected language with specific syntax	1
	Algorithm resembles a pseudo code which can be implemented in any language	Program is more specific to a programming language	1
	<p>Algorithm to find the sum of two numbers:</p> <ol style="list-style-type: none"> 1. Start 2. Read number1, number2 3. Sum = number1 + number2 4. Print Sum 5. End 	<p>Program to find the sum of two numbers in Python:</p> <pre> n1 = int(input("Enter 1st number: ")) n2 = int(input("Enter 2nd number: ")) sum = n1 + n2 print("Sum:", sum) </pre>	1
35.	<p>(a) In computer programming languages operators are special symbols which represent computations, conditional matching etc. The value of an operator used is called operands. Operators are categorized as Arithmetic, Relational, Logical, Assignment etc. Value and variables when used with operator are known as operands.</p> <p>Types:</p> <ol style="list-style-type: none"> 1. Arithmetic operators (with explanation) 2. Relational or Comparative operators (with explanation) 3. Logical operators (with explanation) 4. Assignment operators (with explanation) 5. Conditional operator (with explanation) 	1 1 1 1 1	5
OR			

	<p>CSV File with quote characters:</p> <p>You can write the CSV file with custom quote characters, by registering new dialects using <code>csv.register_dialect()</code> class of <code>csv</code> module,</p> <pre>import csv csvData = [['SNO', 'Items'], ['1', 'Pen'], ['2', 'Book'], ['3', 'Pencil']] csv.register_dialect('myDialect', delimiter = ' ', quotechar = '"', quoting=csv.QUOTE_ALL) with open('c:\pyprg\chl3\quote.csv', 'w') as csvFile: writer= csv.writer(csvFile, dialect=myDialect) writer, write rows(csvData) print("writing completed") csvFile.close()</pre> <p>When you open the "quote.csv" file in notepad, we get following output:</p> <table border="1" data-bbox="391 792 620 949"> <thead> <tr> <th>Sl.No</th> <th>"Items"</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>"Pens"</td> </tr> <tr> <td>2</td> <td>"Book"</td> </tr> <tr> <td>3</td> <td>"Pencil"</td> </tr> </tbody> </table>	Sl.No	"Items"	1	"Pens"	2	"Book"	3	"Pencil"	5	
Sl.No	"Items"										
1	"Pens"										
2	"Book"										
3	"Pencil"										
36.	<p>Syntax:</p> <pre>find(sub[, start[, end]])</pre> <p>Description:</p> <p>The function is used to search the first occurrence of the sub string in the given string. It returns the index at which the substring starts. It returns -1 if the substring does not occur in the string.</p> <p>Example:</p> <pre>>>>str1='mammals' >>>str1.find('ma') 0</pre> <p>(a) <i>On omitting the start parameters, the function starts the search from the beginning.</i></p> <pre>>>>str1.find('ma',2) 3 >>>str1.find('ma',2,4) -1</pre> <p><i>Displays -1 because the substring could not be found between the index 2 and 4-1.</i></p> <pre>>>>str1.find('ma',2,5) 3</pre>	1 1 1 1	5								
OR											

		remove()	pop()	clear()			
		Removes the first occurrence of a specified element from a list.	Removes and returns an element from a specific index (or the last element if no index is specified).	Removes all elements from the list, making it empty.	1		
		list.remove(element)	list.pop(index)	list.clear()	1		
	(b)	Returns None, just removes the element.	Returns the removed element.	Returns None, the list is cleared.	1		
		Raises a ValueError if the element is not found.	Raises an IndexError if the index is out of range.	No error, just empties the list.	1		
		Example: lst = [1, 2, 3, 4]; lst.remove(3) → [1, 2, 4]	Example: lst = [1, 2, 3, 4]; lst.pop(1) → 2, and lst becomes [1, 3, 4]	Example: lst = [1, 2, 3, 4]; lst.clear() → []	1		
	(a)	<pre>for i in range (101, 100, 2): print (i, end = " ")</pre> <p>*Note: The implementation of the program may vary depending on the student's perspective and approach. As long as the logic and output are correct, full marks should be awarded.</p>			5		
	OR						
37.		<p>String Formatting Operators:</p> <p>The string formatting operator is one of the most exciting features of python. The formatting operator % is used to construct strings, replacing parts of the strings with the data stored in variables.</p> <p>Syntax: (<i>"String to be display with %val1 and %val2" %(val1, val2)</i>)</p>			1		
	(b)	<p>Example</p> <pre>name = "Rajarajan" mark = 98 print ("Name: %s and Marks: %d" %(name,mark))</pre> <p>Output</p> <p>Name: Rajarajan and Marks: 98</p>			1	5	

	<p>Formatting characters:</p> <table border="1" data-bbox="312 192 1204 620"> <thead> <tr> <th>Format characters</th> <th>USAGE</th> </tr> </thead> <tbody> <tr> <td>%c</td> <td>Character</td> </tr> <tr> <td>%d (or) %i</td> <td>Signed decimal integer</td> </tr> <tr> <td>%s</td> <td>String</td> </tr> <tr> <td>%u</td> <td>Unsigned decimal integer</td> </tr> <tr> <td>%o</td> <td>Octal integer</td> </tr> <tr> <td>%x or %X</td> <td>Hexadecimal integer (lower case x refers a-f; upper case X refers A-F)</td> </tr> <tr> <td>%e or %E</td> <td>Exponential notation</td> </tr> <tr> <td>%f</td> <td>Floating point numbers</td> </tr> <tr> <td>%g or %G</td> <td>Short numbers in floating point or exponential notation.</td> </tr> </tbody> </table>	Format characters	USAGE	%c	Character	%d (or) %i	Signed decimal integer	%s	String	%u	Unsigned decimal integer	%o	Octal integer	%x or %X	Hexadecimal integer (lower case x refers a-f; upper case X refers A-F)	%e or %E	Exponential notation	%f	Floating point numbers	%g or %G	Short numbers in floating point or exponential notation.	2	
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35.	<p>SQLite:</p> <ol style="list-style-type: none"> SQLite is a simple relational database system, which saves its data in regular data files within internal memory of the computer. It is designed to be embedded in applications, instead of using a separate database server program such as MySQL or Oracle. SQLite is fast, rigorously tested, and flexible, making it easier to work. Python has a native library for SQLite. <p>To use SQLite,</p> <p>Step 1 - import sqlite3</p> <p>Step 2 - create a connection using connect () method and pass the name of the database File</p> <p>Step 3 - Set the cursor object cursor = connection. cursor ()</p> <ul style="list-style-type: none"> Connecting to a database in step2 means passing the name of the database to be accessed. If the database already exists the connection will open the same. Otherwise, Python will open a new database file with the specified name. Cursor in step 3: is a control structure used to traverse and fetch the records of the database. Cursor has a major role in working with Python. All the commands will be executed using cursor object only. <p>To create a table in the database, create an object and write the SQL command in it.</p> <p style="text-align: center;">OR</p> <p>Types of pyplots using Matplotlib:</p> <ul style="list-style-type: none"> ➤ Matplotlib is the most popular data visualization library in Python. It allows you to create two-dimension (2D) charts in few lines of code. ➤ Matplotlib allows you to create different kinds of plots ranging from histograms and scatter plots to bar graphs and bar charts. 	<p>2</p> <p>1</p> <p>2</p> <p>5</p> <p>1</p>																					
(b)		1																					

Line Chart:

A Line Chart or Line Graph is a type of chart which displays information as a series of data points called 'markers' connected by straight line segments. A Line Chart is often used to visualize a trend in data over intervals of time – a time series – thus the line is often drawn chronologically.

Example: Line plot

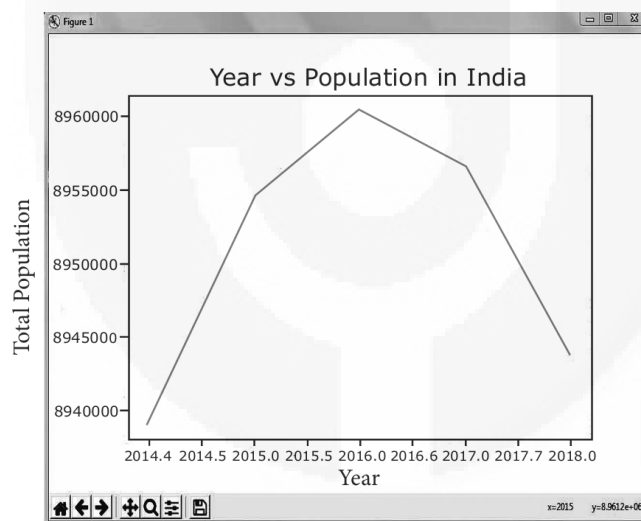
```
import matplotlib.pyplot as plt
years = [2014, 2015, 2016, 2017, 2018]
total_populations = [8939007, 8954518, 8960387, 8956741, 8943721]
plt.plot(years, total_populations)
plt.title("Year vs Population in India")
plt.xlabel("Year")
plt.ylabel("Total Population")
plt.show()
```

In this program,

Plt.title() → specifies title to the graph

Plt.xlabel() → specifies label for X-axis

Plt.ylabel() → specifies label for Y-axis

Output**Bar Chart:**

- A BarPlot (or BarChart) is one of the most common type of plot. It shows the relationship between a numerical data and a categorical value.
- Bar chart represents categorical data with rectangular bars. Each bar has a height corresponds to the value it represents.
- The bars can be plotted vertically or horizontally. It's useful when we want to compare a given numeric value on different categories.
- To make a bar chart with Matplotlib, we can use the plt.bar() function.

1/2

1/2

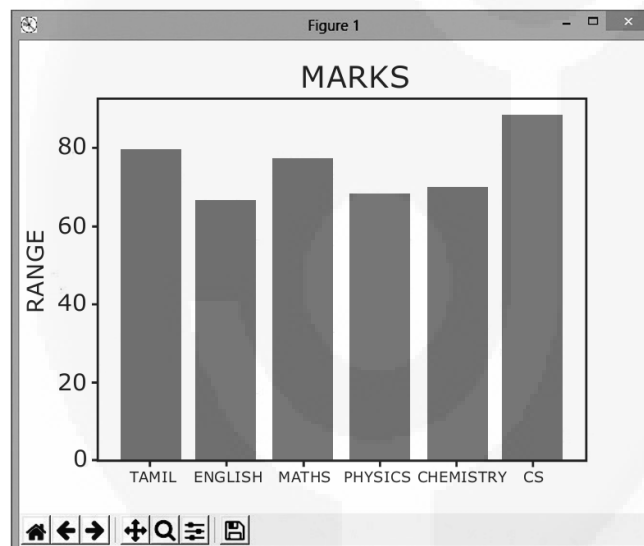
1

1/2

Example

```
import matplotlib.pyplot as plt
# Our data
labels = ["TAMIL", "ENGLISH", "MATHS", "PHYSICS",
"CHEMISTRY", "CS"]
usage = [79.8, 67.3, 77.8, 68.4, 70.2, 88.5]
# Generating the y positions. Later, we'll use them to replace them with
labels.
y_positions = range (len(labels))
# Creating our bar plot
plt.bar (y_positions, usage)
plt.xticks (y_positions, labels)
plt.ylabel ("RANGE")
plt.title ("MARKS")
plt.show()
```

1/2

Output:

1

- o o o -