

**VIT**Vellore Institute of Technology  
(Deemed to be University under section 3 of UGC Act, 1956)  
CHENNAI

Reg. Number:

25 BPS1104

**Continuous Assessment Test (CAT) – I JANUARY 2026**

| Programme                  | : | B.Tech CSE                                                                                                                                                                                                  | Semester     | : | Winter Semester 2025-26                                                                                                                                                                                                                             |
|----------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course Code & Course Title | : | BACSE104 & Structured and Object-Oriented Programming                                                                                                                                                       | Class Number | : | CH2025260501289<br>CH2025260501301<br>CH2025260501512<br>CH2025260501518<br>CH2025260501661<br>CH2025260501947<br>CH2025260501959<br>CH2025260501969<br>CH2025260502397<br>CH2025260502400<br>CH2025260502404<br>CH2025260502407<br>CH2025260502411 |
| Faculty                    | : | LOGESWARI G<br>JOHNSI R<br>BENILA S<br>PANKAJA LAKSHMI P<br>KARTHIKEYAN N<br>CHRISTY JACKSON J<br>GANALA SANTOSHI<br>JEYAVIM SHERIN R C<br>MANIKANDAN P<br>OMANA J<br>AARTHI B<br>PRETHIJA G<br>VALLIDEVI K | Slot         | : | A1                                                                                                                                                                                                                                                  |
| Duration                   | : | 90 Minutes                                                                                                                                                                                                  | Max. Mark    | : | 50                                                                                                                                                                                                                                                  |

**General Instructions:** < Use this space to provide additional information such as graph sheet, data book etc.>

- Write only your registration number on the question paper in the box provided and do not write other information
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

**Answer all questions**

| Q. No | Su b Sec | Description                                                                                                                                                                                                                                                                                              | Marks | CO | BT Level |
|-------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----|----------|
| 1     |          | Meera is analyzing the daily maximum temperature readings of multiple cities. The temperature data is stored in a two-dimensional array, where each row corresponds to a city (the row index is treated as the city ID) and the columns store the maximum temperatures recorded from Sunday to Saturday. | 10    | 1  | K3       |

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| <p>Write a C program that:</p> <ul style="list-style-type: none"> <li>Reads the temperature data for N cities and calculate the average weekly temperature for each city. [4 marks]</li> <li>Compares the average weekly temperatures of all cities and displays the city ID(s) (row indices) having the highest and lowest average temperatures. [3 marks]</li> <li>Accepts a threshold temperature as input and displays the city ID(s) whose average weekly temperature is greater than or equal to the threshold. [3 marks]</li> </ul> <p>A digital locker system in a corporate organization requires employees to set a secure access PIN before storing confidential documents. To ensure data security, the system enforces strict validation rules during PIN creation.</p> <p>As a software trainee, you are assigned to develop a C program using a recursive function that validates the access PIN based on the following conditions [10 marks]:</p> <ul style="list-style-type: none"> <li>The PIN consists only of numeric digits (0-9).</li> <li>The PIN must contain at least four digits.</li> <li>The PIN must include at least one even digit and at least one odd digit.</li> <li>The PIN must not be a palindrome.</li> </ul> <p>A secure messaging application applies simple text transformations before transmitting messages to ensure basic data obfuscation. As part of this process, the application modifies each word in a sentence based on the length of the word.</p> <p>As a software developer, you are required to write a C program that traverses a given sentence word by word and performs the following operations:</p> <ul style="list-style-type: none"> <li>Apply a left cyclic rotation by one position for words with an even number of characters. [3 marks]</li> <li>Apply a right cyclic rotation by one position for words with an odd number of characters. [3 marks]</li> <li>After processing, the program should display the transformed sentence while preserving the original word order. [4 marks]</li> </ul> <p>A resort plans to automate its restaurant billing system for guests. Bill amount is fixed as Rs. 750 per person per visit. To encourage guests from different age groups and visit timings, the resort provides age-based discounts as follows:</p> <p>Age-based Discounts</p> <ul style="list-style-type: none"> <li>35% discount for senior citizens (age <math>\geq 65</math>)</li> <li>25% discount for guests aged 45 to 64</li> <li>15% discount for children aged 10 or below</li> <li>No discount for guests aged 11 to 44</li> </ul> <p>Additional Conditions</p> <ul style="list-style-type: none"> <li>Guests aged above 105 years are excluded from billing calculations.</li> </ul> | 10 | 2 | K3 |
| <p>As a software developer, you are required to write a C program that traverses a given sentence word by word and performs the following operations:</p> <ul style="list-style-type: none"> <li>Apply a left cyclic rotation by one position for words with an even number of characters. [3 marks]</li> <li>Apply a right cyclic rotation by one position for words with an odd number of characters. [3 marks]</li> <li>After processing, the program should display the transformed sentence while preserving the original word order. [4 marks]</li> </ul> <p>A resort plans to automate its restaurant billing system for guests. Bill amount is fixed as Rs. 750 per person per visit. To encourage guests from different age groups and visit timings, the resort provides age-based discounts as follows:</p> <p>Age-based Discounts</p> <ul style="list-style-type: none"> <li>35% discount for senior citizens (age <math>\geq 65</math>)</li> <li>25% discount for guests aged 45 to 64</li> <li>15% discount for children aged 10 or below</li> <li>No discount for guests aged 11 to 44</li> </ul> <p>Additional Conditions</p> <ul style="list-style-type: none"> <li>Guests aged above 105 years are excluded from billing calculations.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10 | 2 | K3 |

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| <p>If a guest visits during weekend, an additional 5% discount is applied on the bill after age-based discount.</p> <ul style="list-style-type: none"> <li>A maximum total discount limit of Rs. 300 is allowed per guest (age-based + weekend discount combined).</li> </ul> <p>You are required to develop a C program that:</p> <ul style="list-style-type: none"> <li>Accepts the number of guests N (where <math>5 \leq N \leq 60</math>).</li> <li>For each guest, reads: <ul style="list-style-type: none"> <li>Age of the guest (<math>1 \leq \text{age} \leq 120</math>)</li> <li>Visit type (1 for weekday, 2 for weekend)</li> </ul> </li> <li>Excludes guests whose age is above 105 from all calculations.</li> </ul> <p>Calculates the final bill amount for each valid guest after applying all applicable discounts. Displays the total amount collected from all valid guests. [10 marks]</p> <p>Predict the output of the program and provide valid reasons to justify the result. [5 marks]</p> <p>Assume that the input strings are:</p> <p>mouse track virtual</p> <pre>#include&lt;stdio.h&gt; int main() {     char *q;     int j;     for (j = 0; j &lt; 3; j++)         scanf("%s", (q + j));     for (j = 0; j &lt; 3; j++)         printf("%c", *(q + j));     for (j = 0; j &lt; 3; j++)         printf("%s", (q + j));     return(0); }</pre> <p>Predict the output of the program and provide valid reasons to justify the result. [5 marks]</p> <pre>#include&lt;stdio.h&gt; int main() {     static int a[] = {0, 1, 2, 3, 4};     int *p[] = {a, a+1, a+2, a+3, a+4};     int **ptr = p;     ptr++;     printf("\n %d %d %d", ptr - p, *ptr - a, **ptr);     *ptr++;     printf("\n %d %d %d", ptr - p, *ptr - a, **ptr);     *ptr++;     printf("\n %d %d %d", ptr - p, *ptr - a, **ptr);     *ptr++;     printf("\n %d %d %d", ptr - p, *ptr - a, **ptr);     return(0); }</pre> <p>*****All the best *****</p> | 10 | 3 | K3 |
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