

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

Reg. Number: 21BPS1532

Continuous Assessment Test (CAT) –II- APRIL 2024

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| Programme | : B.Tech (ECE/ECM/CPS/AI&ML/AIR) | Semester | : WS 2023-24 |
| Course Code & Course Title | : BECE352E -IoT Domain Analyst | Class Number | : CH2023240502557, CH2023240502560, CH2023240502562, CH2023240502564 , CH2023240502566, CH2023240502568, CH2023240502570, CH2023240502572, CH2023240502574, CH2023240502576, CH2023240502578, CH2023240502581, CH2023240502583, CH2023240502585, CH2023240502587 |
| Faculty | : Dr. Raju Patel, Dr. Berlin Hency V, Dr. B. Nagajayanthi, Dr. Chandramauleshwar Roy , Dr. S. R. Mahapatro, Dr. Sritama Roy, Dr. Rohith G, Dr. Manimaran P, Dr. Mangal Das, Dr. Manigandan M, Dr. Upender P, Dr. Pritam Bhattacharjee, Dr. Prasanna Bharathi, Dr. Tanmoy Majumder, Dr. Dhanush R | Slot | : TA2 |
| Duration | : 90 Minutes | Max. Mark | : 50 |

General Instructions: Answer ALL the questions using *appropriate diagram*

- Write your registration number on the question paper in the box provided
- Do not write other information in the question paper.
- Only non-programmable calculator without storage is permitted

| Q. No | Sub Sec | Description | Marks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|----------|---|----------|----------|----------|----------|----------|-------|-------|-------|-----|-----|-----|----|-----|-----|------------|-----|-----|-----|-----|-----|-----|--------|----|-----|----|----|-----|-----|-------|-----|-----|-----|-----|-----|------|----|
| 1. | | <p>Apply a suitable probabilistic classification algorithm to the given dataset as shown in Table.1 and predict as to whether the given fruit is 'Apple' or 'Red Banana' or 'Others', when the known features are (Red, Sweet, long).</p> <p>Table 1:</p> <table><tr><th>Fruit</th><th>Red</th><th>Sweet</th><th>Bitter</th><th>Long</th><th>Short</th><th>Total</th></tr><tr><td>Apple</td><td>350</td><td>450</td><td>150</td><td>0</td><td>100</td><td>650</td></tr><tr><td>Red Banana</td><td>400</td><td>300</td><td>150</td><td>350</td><td>300</td><td>400</td></tr><tr><td>Others</td><td>50</td><td>100</td><td>50</td><td>50</td><td>100</td><td>150</td></tr><tr><td>Total</td><td>800</td><td>850</td><td>350</td><td>400</td><td>500</td><td>1200</td></tr></table> | Fruit | Red | Sweet | Bitter | Long | Short | Total | Apple | 350 | 450 | 150 | 0 | 100 | 650 | Red Banana | 400 | 300 | 150 | 350 | 300 | 400 | Others | 50 | 100 | 50 | 50 | 100 | 150 | Total | 800 | 850 | 350 | 400 | 500 | 1200 | 10 |
| Fruit | Red | Sweet | Bitter | Long | Short | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Apple | 350 | 450 | 150 | 0 | 100 | 650 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Red Banana | 400 | 300 | 150 | 350 | 300 | 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Others | 50 | 100 | 50 | 50 | 100 | 150 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 800 | 850 | 350 | 400 | 500 | 1200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | | <p>Why is it required to reduce the number of features in machine learning? Apply a suitable dimensionality reduction technique to the following data set and reduce the number of features from 2 to 1.</p> <table><tr><th>Feature</th><th>Sample 1</th><th>Sample 2</th><th>Sample 3</th><th>Sample 4</th></tr><tr><td>X</td><td>4</td><td>8</td><td>13</td><td>7</td></tr><tr><td>Y</td><td>11</td><td>4</td><td>5</td><td>14</td></tr></table> | Feature | Sample 1 | Sample 2 | Sample 3 | Sample 4 | X | 4 | 8 | 13 | 7 | Y | 11 | 4 | 5 | 14 | 15 | | | | | | | | | | | | | | | | | | | | |
| Feature | Sample 1 | Sample 2 | Sample 3 | Sample 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | 4 | 8 | 13 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Y | 11 | 4 | 5 | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 3. | (i) | With increased usage of smartphones, sensors and heterogeneous devices, IoT applications handle huge volumes of data. Identify the diverse challenges that this enormous network would face in terms of services, security and data computation. Suggest suitable solutions. | 5 |
| | (ii) | Suggest a suitable AWS IoT architecture to resolve the above-said challenges. Elaborate on the design considerations involved using appropriate diagrams. | 5 |
| 4. | (i) | With increasing smart applications, how are the resources effectively allocated to the changing needs of the customer? Illustrate using suitable challenges and solutions. | 5 |
| | (ii) | How are resource intensive applications handled to reduce latency overhead? Illustrate using suitable challenges and solutions. | 5 |
| 5. | | How are technologies used to simulate human intelligence and decision making? How would user input and user interaction improve the future of smart devices? | 5 |

*****All the best *****