Y/K/TY

Reg. No: 22BCE3754

VIT
Vellore Institute of Technology

Final Assessment Test – November 2025

Course: BCSE316L - Design of Smart Cities
Class NBR(s): 2405/2418/2419
Time: Three Hours
Slot: D1+TD1
Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

COs	CO Statements
CO1	Ascertain and describe the basic concepts of smart and sustainable cities.
CO2	Comprehend the knowledge of urban planning and sustainability in smart cities.
CO3	Analyze the security issues and challenges of smart cities and their advancements.
CO4	Incorporate project management, planning, and stack holders in the design and development of smart cities.
CO5	Investigate the various ICT and data analytics to connect government, urban planners, universities, city developers, and communities.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions
(10 X 10 = 100 Marks)

1. Cities like Barcelona and Singapore use wireless sensor networks to manage traffic, track air quality and make better use of energy. Imagine you are designing a similar system for Chennai city. Explain how wireless sensors network could be used to ease congestion and cut down pollution. Describe how real-time data from these sensors could guide planning decisions and improve daily life for people. Summarize your answer for Chennai city. **CO1 BL2**

2. The Air Casting project show how people can help to collect information about their environment. Suppose your city wants to start a program like this to deal with air pollution and waste. Explain how residents could take part in gathering and sharing data and how their input could help local authorities make smarter choices. Take survey with examples of cities that have tried similar ideas. **CO1 BL4**

3. Utilize the Vehicle Infrastructure Integration concept, develop the smart traffic management with neat architecture and explain with idea, usage of sensors, IoT, social media and conclude with outcome of smart traffic management system. **CO2 BL2**

4. Explain the following Major Renewable Energy Sources with neat diagrams **CO2 *BL2***
   i. Solar Energy
   ii. Thermal Energy
   iii. Wind Energy
   iv. Tidal Energy
   v. Wave Energy

5. Let us assume a Last month, a smart city reported multiple accidents during peak hours because its intelligent traffic management system malfunctioned. Later investigations showed that certain control messages inside the IoT network were deliberately altered, misleading the signals. Analyse how vulnerabilities at different IoT architecture layers (sensing, communication, processing, application) may have contributed to the incident. Based on your analysis, prioritise which layer should be secured first and justify your reasoning. **CO3** **BL4**

6. The security challenges and ethical considerations in smart city development required layer-based attack categorization. List the layers required, explain the layer-based attack and Sources of threats in Smart Cities with neat diagram. **CO3** **BL2**

7.a) Smart city planning refers to the use of technology, data, and innovative approaches to improve efficiency, sustainability, and quality of life in urban areas. The goal is to create cities that are well-connected, environmentally friendly, and designed to meet the evolving needs of their residents with some Smart City Planning Key Aspects. List and explain the key aspects of Smart City Planning with a neat diagram. **CO4** **BL2**

OR

7.b) The G20 Global Smart Cities alliance has developed policy benchmarks that specify the foundational policies that cities need for ethical smart city development. The Alliance is committed to creating a policy roadmap as a baseline for sound technology governance, organized around the following five core principles. Within each of these core principles, the Alliance is coordinating teams of experts to develop model policies based on well-established foundational procedures that have been tried and tested by leading cities. Explain the following test cases and relate with Navi Mumbai city. **CO4** **BL2**

i. Equity, inclusivity, and social impact
ii. Privacy and transparency
iii. Security and resilience
iv. Operational and financial sustainability
v. Openness and interoperability

8.a) Integrated application of advanced technologies using electronics, computers, communication and sensing devices in transportation system to improve efficiency and safety. In what way, Intelligent Transportation System is enriched in the following areas and outline your opinion. **CO5** **BL2**

i. Advanced Traffic Management Systems (ATMS)
ii. Advanced Traveler Information Systems (ATIS)
iii. Advanced Vehicle Control Systems (AVCS)
iv. Advanced Public Transport Systems (APTS)
v. Commercial Vehicle Operations (CVO)

OR

8.b) A highway bridge shows signs of increased vibration during peak traffic hours. What kind of Structural Health Monitoring techniques would you deploy to identify potential structural damage and how would you interpret the vibration data? Explain in detail. **CO5** **BL2**

9. A car equipped with IoV (Internet of vehicle) technology is driving on a busy road. The car receives a signal from an oncoming vehicle about an impending obstacle in its path, which could lead to a collision. Develop the IoV network with system structure diagram to prevent the collision. Explain in detail. CO5 BL3

10. National Institute of Urban Affairs (NIUA) Published the extensive document showcases over 75 innovative smart city projects across India. Many of these involve digital platforms like mobile apps and web portals for citizen engagement, traffic management, and urban infrastructure monitoring. Based on this, you are asked to develop a case study for the following projects. CO4 BL3

i. Bhopal: Smart poles and mobile-based surveillance integration.
ii. Pune: Citizen-centric mobile apps for grievance redressal and service tracking.

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