VIT
Vellore Institute of Technology
CHENNAI

Reg. Number:	22BCE1138

Continuous Assessment Test (CAT) – II AUGUST 2024

Programme	:	B.Tech. Computer Science and Engineering,	Semester	Fall Semester 2024-25
Course Code & Course Title	:	BCSE316L: Design of Smart Cities	Class Number	CH2024250101361, CH2024250101357
Faculty	:	Dr. A SWAMINATHAN Dr. VIGNESH U	Slot	B2+TB2
Duration	:	90 Minutes	Max. Mark	50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only a non-programmable calculator without storage is permitted.
- All the scenario-based questions require proper diagrammatic illustration.

Answer all questions

Q. No	Sub Sec.	Description	Marks
1		During a major event in your smart city, multiple public Wi-Fi networks are set up to provide internet access in public spaces. Upon investigation, it is revealed that a Man-in-the-Middle (MitM) attack has compromised the city's public Wi-Fi network, intercepting sensitive data from users. (a) Analyze how a Man-in-the-Middle attack might exploit the smart city's public Wi-Fi system. (3 Marks) (b) Describe the potential consequences for residents, city services, and infrastructure in the event of such an attack (4 Marks). (c) Propose immediate measures to stop the ongoing attack and recommend long-term security strategies to prevent future MitM attacks. (3 Marks)	10
2		Melakottaiyur is a rural village in Tamil Nadu, India, facing challenges such as inadequate infrastructure, limited access to technology, and insufficient public services. To address these issues and enhance the quality of life for its residents, Melakottaiyur has initiated a plan to transform into a smart city. (i) Mention the innovative financing mechanisms that can be employed to support the transformation of Melakottaiyur from a rural community to a smart city, and how can these mechanisms ensure sustainable and inclusive development? (5 Marks) (ii) Analyze how Melakottaiyur can involve its residents and diaspora through crowdfunding campaigns aimed at raising funds for specific	10

		smart projects (e.g., solar energy, community Wi-Fi). (5 Marks)	
3		During peak hours, the traffic control system in your smart city becomes unresponsive, causing significant traffic jams and disabling communication with emergency response services. Further investigation reveals a Distributed Denial of Service (DDoS) attack, where multiple sources are overwhelming the city's servers, shutting down critical infrastructure. a) Explain the immediate steps you would take to mitigate the impact of a DDoS attack on the city's transportation and emergency services. (3 Marks) b) Evaluate the long-term vulnerabilities in the city's infrastructure that make it susceptible to such attacks. (4 Marks) c)Design a strategy for improving the resilience of the city's systems against future DDoS attacks. (3 Marks)	10
4		Singapore is widely recognized as the world's leading smart city, consistently ranking at the top of various global smart city indices. Its success stems from a strategic focus on innovation, sustainability, and citizen-centric solutions. (i) Summarize the key features that make Singapore a leader in smart city development. (2 Marks) (ii) How has Singapore established itself as the world's number one smart city by adhering to global standards and performance benchmarks, and what lessons can be learned for other cities aiming to enhance their smart city initiatives? (3 Marks)	10
5		In a rapidly developing smart city, thousands of IoT devices—such as smart meters, streetlights, traffic sensors, and surveillance cameras—are integrated into the city's infrastructure to improve efficiency and convenience. However, reports emerge that some of these IoT devices have been hacked, leading to the manipulation of traffic signals and unauthorized access to surveillance footage. These breaches raise concerns about the overall security of the city's IoT network, which is crucial for public safety and service delivery. a. Analyze the key vulnerabilities in the city's IoT infrastructure that could have led to these breaches. (5 Marks) b. Describe how IoT-related safety measures can be implemented to ensure the security and integrity of connected devices. (5 Marks)	10

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