



# VIT

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



SCHOOL OF COMPUTER SCIENCE AND ENGINEERING  
CONTINUOUS ASSESSMENT TEST - I  
WINTER SEMESTER 2024-2025

SLOT: B1+TB1

Programme Name & Branch : B.Tech Computer Science and Engineering  
Course Code and Course Name : CSI3032 Advances in Pervasive computing.  
Faculty Name(s) : Dr. Sukanta Ghosh, Dr. Manoov R & Dr. Sumalatha  
Class Number(s) : VL2024250502118  
Exam Duration : 90 minutes Maximum Marks: 50

General instruction(s):

- Answer All Questions. For each question, answer continuously at a stretch.

Q. No	Question	M	CO	BL
1.	<p>A smart city project, "UrbanEase," aims to implement a pervasive computing environment to improve urban living. To achieve these objectives, the project envisions an ecosystem of interconnected devices, sensors, and applications seamlessly integrated into daily life. The city planners have identified the following specific requirements: Transportation, Waste Management, Energy Efficiency and Public Safety. The planners have concerns about scalability, privacy, and energy efficiency while deploying in the system. In the above context answer the following questions. Describe the essential hardware components (e.g., sensors, actuators, devices) required for implementing each of the identified goals.</p> <p>a) How would context-awareness play a role in transportation updates and energy optimization?</p> <p>b) What measures would you implement to ensure user privacy and prevent unauthorized access to sensitive data?</p> <p>c) Suggest energy-efficient solutions for powering sensors and devices in this pervasive environment.</p> <p>d) How would you design the system to handle a growing number of devices and users?</p>	10	4	2
2.	<p>You are tasked with developing a pervasive computing system that integrates several sensor nodes distributed across a smart city environment. These sensor nodes continuously monitor various parameters like temperature, humidity, traffic density, and air quality, transmitting the collected data to a central processing unit for analysis and decision-making. Given the scale of the deployment (thousands of sensor nodes) and the need for real-time data processing, your system has to ensure that data from various sensor nodes is processed efficiently and promptly.</p> <p>Describe how parallel computing can be used to process the data from these sensor nodes in real-time. What specific parallel computing models (e.g., data parallelism, task parallelism) would you adopt, and why?</p> <p>What are the major challenges you might face in implementing parallel</p>	10	4	2



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	computing?  How will you handle the factors – Scalability, Load Balancing and energy efficiency?			
3.	How can the concept of "user-aware" computing be integrated into HCI system to create personalized and adaptive user experiences?  Also discuss the challenges and ethical considerations associated with collecting and utilizing user data in these systems.	10	6	3
4.	Discuss how "Cache Coherency" is handled by "Snooping Mechanism" in mobile processor SOC.  A mobile processor manufacturing unit is going to develop a robust mobile OS. How will you formulate the new architecture of mobile OS – describe in detail.	5+ 5= 10	6	4
5.	<i>Imagine you are part of a team tasked with designing a mobile networking system for a smart city project. The goal is to provide seamless wireless connectivity across various locations, such as public parks, transportation hubs, and city buildings, ensuring that residents and visitors can access high-speed internet services on their smartphones, laptops, and IoT devices.</i>  Your team decides to deploy IEEE 802.11-based wireless access points (APs) across the city, using the 2.4 GHz and 5 GHz bands. These access points will support mobile devices that frequently move between different coverage zones. Discuss the architecture, characteristics and CSMA protocol in the network.	10	6	3