SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

VI SEMESTER

PCE403 SMART CITIES
Regulation– 2023

Academic Year 2025 – 2026

Prepared by

Dr. A. LEEMAROSE
PROFESSOR
DEPARTMENT OF CIVIL ENGINEERING

SUBJECT CODE/NAME: PCE403 Smart Cities
SEM/YEAR: VI / III

UNIT I – INTRODUCTION			
Urbanisation, need of focused development, role of Authorities, Smart city, Opportunity and Challenges- Smart infrastructures for city- Smart Cities Mission			
PART A			
Q.NO	**QUESTIONS**	**BT LEVEL**	**COMPETENCE**
1.	How would you define the concept of a Smart City?	BT-1	Remember
2.	How can urbanisation be explained in simple terms?	BT-1	Remember
3.	What are the key elements that constitute smart infrastructure?	BT-1	Remember
4.	What benefits does Information and Communication Technology (ICT) offer in the development of smart cities?	BT-2	Understand
5.	What is e-governance?	BT-1	Remember
6.	Mention the challenges of rapid urbanisation.	BT-1	Remember
7.	Define sustainable mobility.	BT-1	Remember
8.	What is meant by smart waste management?	BT-2	Understand
9.	List the smart city applications using IoT.	BT-2	Understand
10.	What is a smart grid?	BT-2	Understand
11.	What is meant by focused development in Smart Cities?	BT-2	Understand
12.	List the components of area-based development (ABD).	BT-2	Understand
13.	What is retrofitting in smart city planning?	BT-2	Understand
14.	What are the challenges in implementing focused development in Indian cities?	BT-2	Understand
15.	Who is a City Urban Local Body (ULB)?	BT-1	Remember
16.	What is the role of the Special Purpose Vehicle (SPV) in Smart Cities?	BT-1	Remember
17.	What are the responsibilities of municipal authorities in smart city implementation?	BT-2	Understand
18.	What is citizen participation in smart governance?	BT-1	Remember
19.	State the functions of the Smart City Advisory Forum (SCAF).	BT-1	Remember
20.	What is meant by inter-agency coordination in Smart City projects?	BT-1	Remember
21.	What are the opportunities created by Smart Cities?	BT-1	Remember
22.	Define urban mobility in the context of Smart Cities.	BT-1	Remember
23.	What do you mean by smart waste management?	BT-2	Understand
24.	What are the challenges faced in smart waste management?	BT-1	Remember

	PART B		
1.	Explain the concept of Smart Cities with reference to the Smart City Mission in India.	BT-3	Apply
2.	Discuss the process and impacts of urbanisation.	BT-3	Apply
3.	Explain in detail the major smart city technologies used in modern urban planning.	BT-3	Apply
4.	Evaluate the challenges in developing Smart Cities in India.	BT-3	Apply
5.	Explain the need for focused development in Smart Cities.	BT-3	Apply
6.	Describe the different components of Area-Based Development (ABD) under the Smart City Mission.	BT-3	Apply
7.	Discuss the *key focus areas* in Smart City development such as smart mobility, smart governance, smart environment, and smart infrastructure.	BT-3	Apply
8.	Evaluate the major challenges in achieving focused development in Smart Cities.	BT-3	Apply
9.	Explain the role of ICT, IoT, and data analytics in achieving focused development within Smart Cities.	BT-3	Apply
10.	Discuss the major opportunities offered by Smart Cities in improving urban governance, service delivery, and citizen engagement.	BT-3	Apply
11.	Explain in detail the economic, social, and infrastructural opportunities created by Smart City initiatives with suitable examples.	BT-3	Apply
12.	Discuss the major challenges in planning and implementing Smart Cities in India. How can these challenges be addressed?	BT-3	Apply
13.	What are the technological challenges associated with IoT, Big Data, and AI in Smart Cities and suggest possible solutions.	BT-3	Apply
14.	Discuss the opportunities and challenges involved in developing smart transportation systems.	BT-4	Analyse
15.	Evaluate the environmental opportunities and sustainability challenges faced by Smart Cities, with reference to climate resilience and resource management.	BT-4	Analyse
16.	Discuss how smart water, smart energy, smart transportation, and smart waste management systems contribute to sustainable urban living.	BT-4	Analyse
17.	What are the challenges in planning, designing, and implementing smart infrastructure in Indian cities under the Smart Cities Mission?	BT-3	Apply

UNIT- II SMART PHYSICAL INFRASTRUCTURE

Infrastructure development in Smart Cities - Physical Infrastructure, Land Use - Compact/mixed-use development, Transit oriented development (TOD); Smart City Management-Transportation Unified governance structure (UMTA). Smart public transportation, Smart parking, Intelligent traffic management, Detour management; Low emission vehicles, Electric Mobility - Environmental projects etc

PART A			
Q.NO	QUESTIONS	BT LEVEL	COMPETENCE

1.	What is Smart Physical Infrastructure?	BT-1	Remember
2.	What are the components of smart city infrastructure?	BT-2	Understand
3.	What is Intelligent Transportation System (ITS)?	BT-3	Apply
4.	What is Smart Water Management?	BT-1	Remember
5.	What is mixed-use development?	BT-1	Remember
6.	Define compact city planning.	BT-2	Understand
7.	What is Transit-Oriented Development (TOD)?	BT-1	Remember
8.	List the benefits of Transit-Oriented Development.	BT-3	Apply
9.	What is mixed-use development?	BT-2	Understand
10.	What is the role of land-use planning in Smart Cities?	BT-3	Apply
11.	Define UMTA (Unified Metropolitan Transport Authority).	BT-3	Apply
12.	What is Intelligent Traffic Management?	BT-2	Understand
13.	Write two features of Smart Public Transportation.	BT-3	Apply
14.	What is smart parking?	BT-3	Apply
15.	Define detour management.	BT-2	Understand
16.	Mention any two examples of low-emission vehicles.	BT-2	Understand
17.	What is the role of land-use planning in Smart Cities?	BT-3	Apply
18.	What is electric mobility?	BT-3	Apply
19.	What is a smart road?	BT-2	Understand
20.	Define integrated multi-modal transport.	BT-1	Remember
21.	What is real-time transit information system?	BT-1	Remember
22.	Define last-mile connectivity.	BT-2	Understand
23.	What is a mobility-as-a-service (MaaS) platform?	BT-1	Remember
24.	Define green mobility.	BT-1	Remember
PART B			
1.	Explain the components and architecture of Smart Physical Infrastructure in Smart Cities.	BT-3	Apply
2.	Discuss the development of Smart Transportation Systems in Smart Cities with examples.	BT-3	Apply
3.	Explain Smart Energy Management and Smart Grid Systems in Smart Cities.	BT-3	Apply
4.	Describe Smart Water and Waste Management Infrastructure in Smart Cities.	BT-3	Apply
5.	Explain the necessity of compact and mixed-use development, and discuss the guiding principles and key advantages associated with it.	BT-3	Apply
6.	Describe transit-Oriented Development (TOD) and its application in Smart Cities.	BT-3	Apply
7.	Explain land-use and transportation integration with examples from Smart Cities.	BT-3	Apply
8.	Describe the governance structure and functions of UMTA in smart city transport management.	BT-4	Analyze
9.	Describe Smart City Management techniques for transportation.	BT-3	Apply
10.	Explain the features and advantages of Smart Public Transportation Systems.	BT-3	Apply

11.	Describe smart parking and its role in congestion reduction.	BT-3	Apply
12.	Explain intelligent traffic management systems and technologies used.	BT-3	Apply
13.	Write in detail about detour management and emergency traffic planning.	BT-3	Apply
14.	Describe environmental projects implemented under Smart Cities Mission.	BT-3	Apply
15.	Explain how ICT and IoT technologies support urban infrastructure development.	BT-3	Apply
16.	Describe multi-modal transportation planning and its importance in Smart Cities.	BT-4	Analyze
17.	Explain the concept of green mobility and its applications in Smart Cities.	BT-3	Apply

UNIT- III SUSTAINABILITY AND SMART PLANNING

Relationship Between Sustainability and Smart planning - Place making project guidelines Surveillance, Smart Street Lighting, Intelligent Emergency Services, Intelligent Disaster Forecasting and Management, GIS-based Spatial Decision Support Systems, Smart Communication Services;

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define sustainability in the context of smart planning.	BT-1	Remember
2.	What is the relationship between sustainability and smart planning?	BT-2	Understand
3.	Define placemaking.	BT-2	Understand
4.	Mention any two guidelines for placemaking projects.	BT-1	Remember
5.	What is smart surveillance?	BT-1	Remember
6.	What are smart streetlights?	BT-1	Remember
7.	Define intelligent emergency services.	BT-1	Remember
8.	What is meant by disaster forecasting?	BT-2	Understand
9.	Define a Spatial Decision Support System (SDSS).	BT-2	Understand
10.	What is GIS-based decision making?	BT-2	Understand
11.	Mention any two uses of GIS in smart planning.	BT-2	Understand
12.	Define smart communication services.	BT-1	Remember
13.	What is ICT and why is it important in Smart Cities?	BT-2	Understand
14.	What is resilience in smart planning?	BT-2	Understand
15.	Write any two environmental sustainability indicators.	BT-2	Understand
16.	What is adaptive lighting?	BT-2	Understand
17.	Define disaster management.	BT-2	Understand
18.	What is an emergency response system?	BT-1	Remember
19.	Define real-time monitoring.	BT-2	Understand
20.	Mention two components of an early warning system.	BT-3	Apply
21.	What is a command-and-control centre?	BT-3	Apply
22.	What is geo-tagging?	BT-3	Apply
23.	Define community-centric planning.	BT-3	Apply

24.	Mention any two examples of intelligent transport emergency systems.	BT-3	Apply
PART B			
1.	Explain the relationship between sustainability and smart planning in Smart Cities.	BT-3	Apply
2.	Describe the components, principles, and benefits of placemaking in sustainable smart urban development.	BT-3	Apply
3.	Explain placemaking project guidelines with examples from Indian Smart Cities.	BT-3	Apply
4.	Describe smart surveillance systems and their applications in ensuring urban safety and sustainability.	BT-3	Apply
5.	Explain the features, functions, and advantages of smart street lighting in Smart Cities.	BT-4	Analyze
6.	Describe intelligent emergency services and their integration with Smart City infrastructure.	BT-4	Analyze
7.	Explain intelligent disaster forecasting systems and their importance in creating resilient Smart Cities.	BT-4	Analyze
8.	Discuss disaster management supported by IoT, GIS, and predictive analytics in Smart City planning.	BT-4	Analyze
9.	Explain the architecture, components, and applications of GIS-based Spatial Decision Support Systems (SDSS).	BT-4	Analyze
10.	Describe the role of GIS-based SDSS in sustainable land-use and urban planning.	BT-4	Analyze
11.	Discuss how Smart Communication Services support sustainability and smart governance.	BT-4	Analyze
12.	Explain the role of ICT and IoT in sustainable smart planning with relevant examples.	BT-4	Analyze
13.	Discuss the use of AI, big data, and predictive analytics in smart disaster forecasting and management.	BT-3	Apply
14.	Explain how Smart City Command and Control Centres enhance emergency response management.	BT-3	Apply
15.	Describe the role of community participation in sustainable smart planning and placemaking.	BT-4	Analyze
16.	Discuss the integration of smart infrastructure (lighting, surveillance, communication) for safer public spaces.	BT-3	Apply
17.	Explain the relationship between sustainability and smart planning in Smart Cities.	BT-3	Apply
UNIT- IV APPLICATION OF TECHNOLOGIES IN SMART CITIES			

Role of Technologies in Smart Cities – Internet of Things - Integrated Command and Control Center (ICCC), Data Analytics, Data driven strategies implementation in smart cities – Smart governance platform.

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
PART A			
1.	What is the role of technology in smart cities?	BT-1	Remember
2.	Define Internet of Things (IoT).	BT-2	Understand
3.	List any two components of IoT architecture.	BT-2	Understand
4.	What is meant by sensors in smart city applications?	BT-2	Understand

5.	Define actuators.	BT-2	Understand
6.	What are the functions of ICCC?	BT-2	Understand
7.	Define Data Analytics.	BT-1	Remember
8.	What is data-driven decision-making?	BT-1	Remember
9.	What is a Smart Governance Platform?	BT-1	Remember
10.	What are the benefits of smart governance?	BT-1	Remember
11.	What is a digital twin in Smart Cities?	BT-1	Remember
12.	Define smart mobility.	BT-1	Remember
13.	What is real-time data?	BT-1	Remember
14.	What are the IoT sensors used in smart city solutions.	BT-2	Understand
15.	What is predictive analytics?	BT-2	Understand
16.	State the purpose of GIS in Smart Cities.	BT-2	Understand
17.	What is smart surveillance?	BT-2	Understand
18.	What is an urban data platform?	BT-2	Understand
19.	Define cloud computing in the context of Smart Cities.	BT-1	Remember
20.	What is interoperability?	BT-1	Remember
21.	What is a dashboard in ICCC?	BT-1	Remember
22.	What is smart metering?	BT-1	Remember
23.	Define command and control operations.	BT-1	Remember
24.	What is a citizen grievance redressal portal?	BT-1	Remember
PART B			
1.	Explain the role of technologies in smart cities with suitable examples.	BT-4	Analyze
2.	Discuss the importance of ICT and digital technologies in smart city development.	BT-4	Analyze
3.	Explain the concept and architecture of Internet of Things (IoT) for smart cities.	BT-4	Analyze
4.	Describe various IoT applications in smart city infrastructure.	BT-4	Analyze
5.	Explain the Integrated Command and Control Center (ICCC) in detail.	BT-4	Analyze
6.	Discuss the functions and components of ICCC in smart city management.	BT-3	Apply
7.	Explain how ICCC enables real-time monitoring and decision making.	BT-3	Apply
8.	Describe the role of data analytics in smart cities.	BT-3	Apply
9.	Explain different types of data analytics used in smart city projects.	BT-4	Analyze
10.	Discuss the importance of data-driven strategies in smart city implementation.	BT-3	Apply
11.	Explain the process of data-driven strategy formulation and implementation in smart cities.	BT-3	Apply

12.	Describe the role of big data and cloud computing in smart city governance.	BT-4	Analyze
13.	Explain the concept of smart governance platform.	BT-4	Analyze
14.	Discuss the features and benefits of smart governance platforms.	BT-4	Analyze
15.	Explain the role of e-governance and digital platforms in smart cities.	BT-4	Analyze
16.	Discuss the importance of citizen participation and feedback systems in smart governance.	BT-4	Analyze
17.	Explain the challenges in adopting advanced technologies in smart cities.	BT-3	Apply
18.	Discuss suitable case studies on technology applications in Indian smart cities.	BT-3	Apply

UNIT- V SMART CITIES PROJECT MANAGEMENT

Need for project management, Philosophy and concepts; Project phasing and stages; Project organizational structuring: Planning and Scheduling: Project cost analysis; Procurement and Contracting: PPP: Project Monitoring and Evaluation: Risk Management; Case studies.

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define a smart city project.	BT-1	Remember
2.	What is meant by project management?	BT-1	Remember
3.	State the need for project management in smart city projects.	BT-2	Understand
4.	What is the philosophy of project management?	BT-2	Understand
5.	Define the project life cycle.	BT-1	Remember
6.	List the stages involved in smart city project phasing.	BT-2	Understand
7.	What is meant by project conceptualization?	BT-2	Understand
8.	Define Detailed Project Report (DPR).	BT-2	Understand
9.	What is a Special Purpose Vehicle (SPV)?	BT-2	Understand
10.	State any two advantages of projected organization.	BT-2	Understand
11.	What is project planning?	BT-2	Understand
12.	Define project scheduling.	BT-1	Remember
13.	What is a bar chart?	BT-2	Understand
14.	Define Critical Path Method (CPM).	BT-2	Understand
15.	What is project cost analysis?	BT-1	Remember
16.	List any two components of project cost.	BT-1	Remember
17.	What is procurement?	BT-2	Understand
18.	Define EPC contract.	BT-2	Understand
19.	What is Public–Private Partnership (PPP)?	BT-2	Understand
20.	Mention any two PPP models used in smart cities.	BT-2	Understand
21.	What is project monitoring?	BT-2	Understand
22.	What is project evaluation?	BT-1	Remember

23.	Define risk in project management.	BT-2	Understand
24.	List any two types of risks in smart city projects.	BT-2	Understand
PART B			
1.	Explain the need for project management in smart city development projects.	BT-3	Apply
2.	Discuss the philosophy and basic concepts of project management in detail.	BT-3	Apply
3.	Explain the project life cycle and stages involved in smart city projects.	BT-3	Apply
4.	Describe the project phasing and stages with a neat flow diagram.	BT-3	Apply
5.	Explain the organizational structure adopted for smart city project management.	BT-3	Apply
6.	Discuss the role and functions of SPV (Special Purpose Vehicle) in smart city projects.	BT-3	Apply
7.	Explain the importance of planning and scheduling in smart city projects.	BT-3	Apply
8.	Describe project planning tools and scheduling techniques such as CPM and PERT.	BT-4	Analyze
9.	Explain the components and methods of project cost analysis.	BT-3	Apply
10.	Discuss life cycle cost analysis and its importance in smart city projects.	BT-3	Apply
11.	Explain the procurement process adopted for smart city projects.	BT-3	Apply
12.	Discuss various contracting methods used in smart city infrastructure development.	BT-3	Apply
13.	Explain the concept of Public–Private Partnership (PPP) and its relevance to smart cities.	BT-4	Analyze
14.	Discuss different PPP models used in smart city projects with merits and demerits.	BT-4	Analyze
15.	Explain the process of project monitoring and evaluation in smart cities.	BT-4	Analyze
16.	Discuss the role of ICT and smart technologies in project monitoring and evaluation.	BT-3	Apply
17.	Explain risk management in smart city projects and list risk mitigation measures.	BT-4	Analyze
18.	Discuss any two smart city case studies highlighting project management practices.	BT-4	Analyze