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**Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)**



Ph.D. (First Semester-Summer) Examinations, December - 2025
23SPPEEC1014 - Internet of Things and Application
(ECE)

Time: 3 hrs

Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions.	(14 x 5 = 70 Marks)	Marks
1.a. Explain the key technological and market drivers behind the transition from traditional Information Technology (IT) to the Internet of Things (IoT). Discuss its transformative impact on two different industries (e.g., manufacturing and agriculture).		8
b. Define peer-to-peer (P2P) networking in the context of IoT. How does it differ from traditional client-server models, and what advantages does it offer for decentralized IoT applications?		6
2. Discuss the concept of a "Fractal City" and its relationship with IoT-driven urban evolution. Using specific examples, analyze how IoT technologies (like smart sensors and data analytics) can enhance city planning, infrastructure management, and resilience.		14
3.a. Compare and contrast the features of IPv4 and IPv6 in the context of IoT. Why is IPv6 considered critical for the future scalability of IoT, and what are the practical challenges in its widespread adoption?		7
b. Explain the challenges and opportunities of client-side control and configuration for IoT devices. How can user-friendly interfaces and remote management tools improve user adoption and system effectiveness?		7
4. Describe the role of IoT in creating a Smart Grid. Explain how IoT technologies enable efficient energy distribution, demand response, integration of renewable sources, and improve overall grid stability and sustainability.		14
5.a. Discuss the purpose and characteristics of two key IoT communication protocols (e.g., MQTT and CoAP). How do they facilitate efficient, lightweight data exchange in constrained network environments?		7
b. Provide an overview of I/O drivers in embedded IoT systems. How does C programming facilitate the development of low-level drivers for interfacing with various sensors and actuators?		7
6.a. Differentiate between Personal Area Networks (PAN), Local Area Networks (LAN), and Wide Area Networks (WAN) in the context of IoT connectivity. Provide a typical application scenario and the enabling technology (e.g., Bluetooth, LoRaWAN) for each.		7
b. Introduce the challenges of Big Data as it applies to IoT. Discuss the key considerations for managing the Volume, Velocity, and Variety (the 3Vs) of data generated by large-scale IoT deployments.		7

7. Analyze the application of IoT in the transportation sector, focusing on connected and autonomous vehicles. How do IoT technologies enhance vehicle safety, traffic management, navigation, and the overall user experience? 14
- 8.a. Discuss the security and legal considerations specific to IoT applications in critical infrastructure. How does the IT Act, 2000 address issues like data breaches, and what are the arguments for needing additional, IoT-specific legislation? 7
- b. Explain the importance of caching strategies at the network edge in IoT. How does intelligent caching improve data retrieval times and reduce the load on core network infrastructure? 7

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