Reg. No.																

Question Paper Code	14475

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Second Semester

M.E. - Embedded Systems Technologies

24PESPC202 - PERVASIVE DEVICES AND TECHNOLOGY

Regulations -2024

Duration: 3 Hours Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	WSNs differ from ad hoc networks mainly because WSNs are a) Designed for multimedia streaming b) Data-centric and resource-constrained c) Always connected to the Internet d) Used only in military applications	*1*	*K2*	*CO1*
2.	Which layer is mainly responsible for transceiver design considerations in WSNs? a) Network layer b) Transport layer c) Physical layer d) Application layer	*1*	*K2*	*CO1*
3.	Which of the following is a commercially available sensor node? a) MicaZ b) Arduino UNO c) Raspberry Pi d) Intel i7	*1*	*K2*	*CO1*
4.	The architecture of a single sensor node typically includes a) Sensor, processor, memory, and transceiver b) Router and switch c) Only a processor d) Antenna and display	*1*	*K1*	*CO2*
5.	The major source of energy consumption in a sensor node is: a) Display unit b) Keyboard c) Communication module d) Printer	*1*	*K1*	*CO2*
6.	Which of the following is an important requirement of an operating system for wireless sensor networks (WSNs)? a) High power consumption b) Large memory usage c) Energy efficiency d) Complex user interface	*1*	*K2*	*CO2*
7.	Flooding in WSN data dissemination may lead to: a) Increased bandwidth efficiency b) Reduced redundancy c) Implosion and overlap problem d) Perfect routing	*1*	*K1*	*CO3*
8.	The main purpose of a gateway in a wireless sensor network is to: a) Increase node battery life b) Connect the sensor network to external networks c) Replace sensor nodes d) Reduce sensing operations	*1*	*K1*	*CO3*
9.	Which data dissemination technique reduces redundant message transmission compared to flooding? a) Broadcasting b) Routing c) Gossiping d) Clustering	*1*	*K3*	*CO3*
10.	The IEEE 802.11 standard is associated with: a) Bluetooth b) Zigbee c) Wireless LAN d) RFID	*1*	*K2*	*CO4*

11.	Bluetooth primarily operates in which frequency band?		*1*	*K3*	*CO4*
	a) 900 MHz	b) 2.4 GHz ISM band			
	c) 5 GHz band	d) 60 GHz band			
12.	In the IEEE 802.11 architecture, the basic service set (BSS) consists of:		*1*	*K3*	*CO4*
	a) Only access points	b) Stations communicating without AP			
	c) A group of stations controlled by an access point	d) Routers and switches			
13.	The SMAC protocol mainly aims to reduce:		*1*	*K3*	*CO5*
	a) Transmission speed	b) Sensor size			
	c) Memory size	d) Energy consumption			
14.	The LEACH protocol in WSN is mainly based on:		*1*	*K3*	*CO5*
	a) Cluster-based communication	b) Wired communication			
	c) Optical routing	d) Satellite networking			
15.	The IEEE 802.15.1 standard corresponds to		*1*	*K1*	*CO6*
	a) WiMAX	b) Zigbee			
	c) Bluetooth	d) WLAN			
16.	In Bluetooth, a small network formed by one master and slave devices is called a_____		*1*	*K3*	*CO6*
	a) Backbone	b) Gateway			
	c) Cluster tree	d) Piconet			

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)
Answer ALL Questions

17.	Differentiate Wireless Sensor Networks and Ad Hoc Networks based on architecture and applications.	*3*	*K4*	*CO1*
18.	Identify the design issues involved in developing operating systems for wireless sensor networks and evaluate how they differ from those of general-purpose operating systems.	*3*	*K3*	*CO2*
19.	Determine the role of a gateway in integrating sensor networks with external communication networks.	*3*	*K4*	*CO3*
20.	Analyze the differences between Wireless PAN and Wireless MAN.	*3*	*K4*	*CO4*
21.	Show the role of wakeup concepts in low-duty-cycle MAC protocols.	*3*	*K3*	*CO5*
22.	Identify the applications of Bluetooth piconets.	*3*	*K3*	*CO6*

PART - B (Descriptive Answer Questions)
(6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Illustrate the characteristic requirements and challenges involved in wireless sensor networks with suitable examples.	*11*	*K3*	*CO1*
		OR			
	b)	Draw the architecture of a commercial sensor node and demonstrate the role of sensing, processing, communication, and power units.	*11*	*K3*	*CO1*
24.	a)	Apply the architecture of a typical sensor node and explain the function of each component.	*11*	*K3*	*CO2*
		OR			
	b)	Illustrate various sensor network scenarios and analyze the optimization goals, figures of merit, and design principles involved in WSN architecture.	*11*	*K3*	*CO2*

25.	a)	Compare flooding and gossiping mechanisms in terms of data redundancy, delay, and energy efficiency.	*11*	*K3*	*CO3*
		OR			
	b)	Use suitable network architecture for an environmental monitoring application using wireless sensor networks. Justify the choice of gateway, optimization goals, and figures of merit.	*11*	*K3*	*CO3*
26.	a)	Analyze the IEEE 802.11 protocol architecture and services provided in wireless LAN.	*11*	*K4*	*CO4*
		OR			
	b)	Examine the working principles and applications of HiperLAN.	*11*	*K4*	*CO4*
27.	a)	Assess contention-based and schedule-based MAC protocols used in wireless sensor networks.	*11*	*K4*	*CO5*
		OR			
	b)	Examine the energy management techniques used in SMAC and evaluate their effectiveness.	*11*	*K4*	*CO5*
28.	a)	Illustrate the functions of the Bluetooth Link Manager Layer and frame structure.	*11*	*K3*	*CO6*
		OR			
	b)	Compare Bluetooth networking with other wireless networking technologies in terms of range, data rate, and applications.	*11*	*K3*	*CO6*