Total number of printed pages:03 **D/6th Sem/DECE 613A**

2023

Internet of Things

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Write the component of air condition which is used for home automation in IoT.	5
	b)	What is smart city ? Explain the role of IoT in a smart city.	5
	c)	Write a short note on edge computing ?	5
	d)	Highlight role of IoT in smart agriculture.	5
2.	a)	Explain the following (1) Augmented reality (2) Extended reality (3) Virtual reality.	5
	b)	Explain the role of IoT in combating the forest fire.	5
	c)	In a wireless sensor network, temperature data is collected by 5 sensor nodes deployed in a field. Each node measures the temperature in its vicinity and sends the data to a central coordinator. The temperatures are recorded in Celsius. Node 1: 25°C Node 2: 28°C Node 3: 24°C Node 4: 26°C Node 5: 27°C Calculate the average temperature across all the sensor nodes.	5

	(d)	What is the different between the FOG Computing and Dew Computing ?	5
3.	a)	With a diagram explain what is wireless sensor network ? What is data dissemination and gathering in wireless sensor network ?	10
	b)	Explain the routing strategies in wireless sensor network. Explain in detail the following: (a) Proactive strategy (b) Reactive strategy (c) Hybrid Strategy	10
4.	a)	What is MAC protocol ? Explain the following protocol: (a) CSMA/CA (b) Slotted ALOHA (c) CSMA/CD	10
	b)	What is demand assignment protocol ? Explain the following terminology in the demand assignment protocol (a) Polling (b) Reservation	10
5.	(a)	In detail explain the routing challenges and design issue in wireless sensor network.	8
	(b)	You have a wireless sensor network consisting of 8 sensor nodes. Each node can communicate directly with its neighboring nodes within a radius of 50 meters. The nodes are randomly distributed in a field, and their positions are represented by their coordinates (x, y) in meters. Given the coordinates of the sensor nodes as follows: Node 1: (10, 20) Node 2: (30, 40) Node 3: (50, 60) Node 4: (70, 80) Node 5: (90, 100) Node 6: (110, 120) Node 7: (130, 140) Node 8: (150, 160). Draw a representation of the field and the positions of the sensor nodes. Then, determine the pairs of nodes that can establish a direct communication link within the given communication range.	12

6.	(a)		Write a short note on (i) LEACH (ii) PEGASIS	12
	(b)		A company has deployed an Internet of Things (IoT) system to monitor the energy consumption of different devices in an office building. The IoT system consists of 8 smart plugs installed in various rooms. Each smart plug measures the power consumed by the connected device and sends the data to a central server. The power consumption readings are recorded in watts (W). Given the power consumption readings from the 8 smart plugs as follows: Smart Plug 1: 150 W Smart Plug 2: 125 W Smart Plug 3: 200 W Smart Plug 4: 175 W Smart Plug 5: 190 W Smart Plug 6: 180 W Smart Plug 7: 140 W Smart Plug 8: 165 W Calculate the average power consumption and the highest power consumption among all the devices connected to the smart plugs.	8