Name: **Enrolment No:**	

UPES

Supplementary Examination, December 2023

Course: System Networks **Semester: I**

Program: M. Tech Automation and Robotics Engg. **Time: 03 hrs.**

Course Code: ECEG-7026 **Max. Marks: 100**

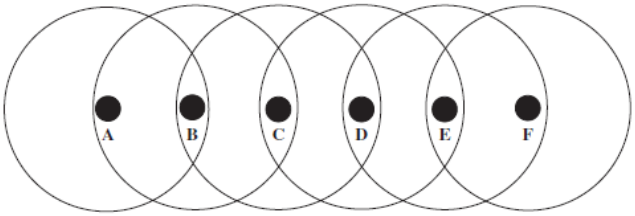
SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain the architecture of a sensor node.	**4**	**CO1**
Q 2	Enumerate different uses of wireless sensor networks.	**4**	**CO2**
Q 3	Explain the challenges in designing operating systems for wireless sensor networks.	**4**	**CO3**
Q 4	Provide a concise description of the specified sensor nodes. (a) MICA2 (b) BT node.	**4**	**CO3**
Q 5	What do understand by sensor in WSN? Explain Types of sensors and its application in detail	**4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Instruction: Write brief notes. (100-150 words)

Q 6	Examine the energy consumption idea pertaining to the various components of a sensor node. What energy source is used in WSN?	**10**	**CO1**
Q 7	What is a routing protocol? Outline the issues in designing a routing protocol for wireless sensor networks.	**10**	**CO2**
Q 8	Discuss about the transceiver tasks and characteristics in a sensor node in a wireless sensor network.	**10**	**CO3**
Q 9	Discuss about the LEACH, PEGASIS – Location Based Routing – GF, GAF, GEAR, GPSR in WSN. ***OR*** Consider the network topology in Figure 1, where circles indicate the communication and interference range of each node, that is, each node can hear the immediate neighbors to the left and right. Assume that RTS/CTS is not being used.	**10**	**CO4**

	 Figure 1		
SECTION-C (2Q x 20M=40 Marks)			
Q 10	Explain the following terms for communication system and sensor networks . **(a)** Processing Gain **(b)** Jamming Margin **(c)** Multipath Interference **(d)** Bit error rate **(e)** Signal to noise ratio (f) Throughput (g) End to end delay (h) control overhead ***OR*** Discuss the homogeneous and heterogenous routing algorithms of MANET with detailed features.	**20**	**CO2**
Q 11	Attempt any **Two.** (a) Detail the concept of frequency hopping. How to evaluate the performance of FHSS in AWGN channel and partial band interface. (b) How the data is communicated in VANET communication. Take a case of 100 nodes communicating in VANET, Suggest the concept of optimal path routing and energy efficient. **(c)** Detailed the role of signal filtering in sensor networks of FIR filter realization. (d) What are the different software tools used to estimate the performance of sensor networks.	**20**	**CO4**