


Name:			
Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2022			
Course: Wireless Sensor Networks Program: B Tech ECE Course Code: ECEG4029		Semester: VIII Duration: 03 hrs. Max. Marks: 100	
Instructions: <ul style="list-style-type: none"> • Attempt all questions as per the instruction. • Assume any data if required and indicate the same clearly. • Unless otherwise indicated symbols and notations have their usual meanings. • Strike off all unused blank pages 			
SECTION A (5Qx4 = 20 Marks)			
S. No.		Mark s	CO
Q 1	How sensor nodes are deployed in their environment?	4	CO1
Q 2	Name at least four techniques to reduce power consumption in wireless sensor networks (WSN).	4	CO1
Q 3	Write the basic functionalities of MAC protocols.	4	CO2
Q 4	Compare the following MAC protocols: Scheduled based and Contention-based MAC protocols	4	CO2
Q 5	Define routing in a network. Also describe the flooding technique used for path discovery and information dissemination in wired and wireless ad hoc networks.	4	CO3
SECTION B (4Qx10 = 40 Marks)			
Q 6	What are the sensor node components? Explain any two main components of sensor node.	10	CO1
Q 7	What are the major tasks in S-MAC protocol to reduce energy consumption? How it will achieve these explain in detail.	10	CO2
Q 8	Explain the Low Energy Adaptive Clustering Hierarchy (LEACH) routing algorithm for wireless sensor network.	10	CO3
Q 9	Describe the two sensing models that used in WSNs. Explain how the power control mechanism used for topology control in WSN. Or Explain the Growing a tree (Naive approach) algorithm that used for topology control in WSN.	10	CO4
SECTION C (2Qx20 = 40 Marks)			
Q 10	(a) Discuss the Greedy Perimeter Stateless Routing (GPSR) algorithm.	20	CO3

(b) Consider the topology in **Figure 1**. Node A wishes to forward a packet toward destination L via one of its neighbours (its communication range is indicated with the circle). Apply forwarding strategies of GPSR to determine which neighbour will A choose with each of the following forwarding strategies:

- (i) greedy forwarding
- (ii) nearest with forwarding progress
- (iii) most forwarding progress within radius
- (iv) compass routing

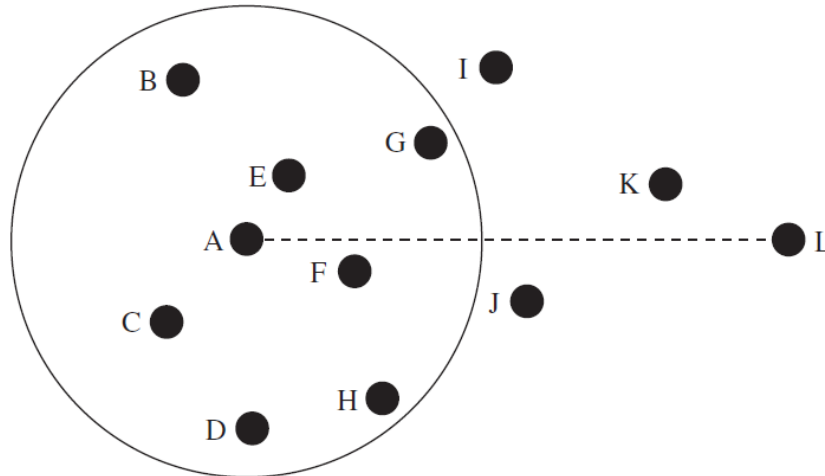


Figure 1

Or

Consider the following WSN scenarios

- (a) A WSN is used to monitor air pollution in a city where every sensor reports its sensor data once every minute to a single remote base station. Most sensors are mounted on lamp posts, but some are also mounted on city buses.
- (b) A WSN is used to measure humidity in a field, where low-power sensors report measurements only when certain thresholds are exceeded.
- (c) A WSN is used to detect the presence of vehicles, where each sensor locally records the times of vehicle detection. These records are delivered to the base station only when the sensor is explicitly queried.

Analyse and demonstrates why you would choose either a proactive or a reactive routing solution in each scenario.

Q 11	<p>(a) Discuss the design Issues of Operating Systems (OS).</p> <p>(b) Analyse how TinyOS overcome the design issues of OS discussed in part(a) with the architecture that consists of a scheduler and a set of components which can be connected with each other through well-defined interfaces.</p>	20	CO4
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