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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T-3 EXAMINATION- June, 2018

B.Tech. [Open Elective Course]

MAX. MARKS:35

COURSE NAME: Wireless Sensor Networks Protocols and Applications

COURSE CREDITS: 03

CODE: 15B1WCI831

MAX. TIME: 2Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Section A: Each Question carries seven marks. [7 X 5= 35 Marks]

1. (a) Identify the causes and characteristics of transmission errors in wireless sensor networks (WSNs). List out the key ingredients of ARQ protocol. Mention at least two standard ARQ protocols. [4 Marks]

1. (b) How FEC technique is differ from the ARQ mechanism? Show the conceptual view of FEC placement in a send/ receive chain. Comment on energy efficiency in term of FEC and ARQ techniques. [3 Marks]

2. (a) How we do address and name management in wireless sensor networks ? Explain random address assignment with the help of suitable example. List out the role of address allocation, address deallocation, address representation, binding and network partition in respect of address management tasks. [4 Marks]

2 (b) Why is localization needed in Wireless Sensor Networks? Name at least two applications where location is required? A group of N stations share a 28 kbps pure (unslotted) aloha channel. Each station has one (NEW) packet arriving every 150 seconds and packets are 1000 bits long. What is the maximum value of N that the channel can accommodate? [3 Marks]

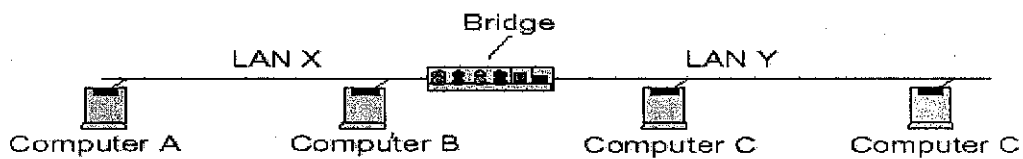
Q.3 (a) Mention the need of time synchronization in wireless sensor networks (WSNs). Identify the criteria used to classify the time synchronization protocols. What are the performance metrics used for time synchronization algorithms in WSNs ? [5 Marks]

Q.3. (b) Explain the concept behind the RBS protocol? How can RBS be extended to work in multihop scenario? A signal is carrying data in which one data element is encoded as one signal

element ($r=1$). If the bit rate is 200 kbps, what is the average value of the baud rate if c is between 0 and 1? [2 Marks]

4. (a) Differentiate between single hop and multi-hop localization in WSN. Write down the concept behind the Active Badge, Active Office and RADAR. [4 Marks]

4.(b) A small Local Area Network (LAN) has four computers A, B, C and D connected in the following topology:



(a) The computer A sends a graphics file of size 10 MB simultaneously to computers B, C, and D using Unicast packets constructed by the Universal Datagram Protocol (UDP). Calculate the utilization of LAN X, given that each frame carries 1024 B of UDP payload data, and transmission is at 50 packets per second to each destination.

(b) What is the utilization on LAN Y? [3 Marks]

Q.5. (a) What is the basic concept behind the Geographic Routing? Show the simple greedy geographic forwarding scheme. How the simple greedy geographic forwarding fails in presence of obstacles? Explain the right hand rule to recover greedy routing.

[4 Marks]

Q.5 (b) What is the role of data aggregation in WSN? Write down the syntax of an SQL query to aggregate data from a sensor network. How a node came to know that it should further stop waiting for more data during data aggregation. [3 Marks]

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