2019

COMPUTER SCIENCE AND ENGINEERING

Paper : CSEL – 843

(Wireless Sensor Network)

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer *question nos.* **1, 2** and *any four* from the rest.

1. Answer *any five* of the following :   2×5

    (a) State the principal feature of a "Contention based protocol".

    (b) Define "Extended Service Set" (ESS).

    (c) Name two applications (with brief justification) where ad-hoc network is suitable compared to infrastructure based network.

    (d) State the reason(s) for using hierarchical routing instead of flat routing approach.

    (e) "Energy is the most crucial metric for routing in WSN"— Comment.

    (f) Why is the DSR termed as "source routing"?

    (g) Asymmetric (or unidirectional) links occur when node A can hear node B, but B cannot hear node A. State whether this could be a problem for the AODV protocol or not.

2. Answer *any five* of the following :   4×5

    (a) Explain the "implosion" and "overlap" problem in WSN with a suitable diagram.

    (b) State the unique features and constraints of a Wireless Sensor Network.

    (c) Comment on the bandwidth requirement of Distance Vector and Link State with brief justification.

    (d) Describe the role of "Network Allocation Vector" in CSMA protocol.

    (e) Distinguish between Broadcasting and Boarder casting.

    (f) Describe the role of PCF; even if DCF exists in the same layer for medium access.

    (g) State a WSN application for each of the following categories : time-driven, event-driven and query-driven.

3. (a) State the reason(s) for not using CSMA/CD in Wireless LAN.

    (b) How the "exposed station problem" affects the performance of a MAC protocol?

    (c) Do you think the "location information" of a node may help to reduce the overhead of the routing? Explain your answer.   2+4+4

Please Turn Over

4. (a) "Rumour routing attempts to combine the characteristics of event flooding and query flooding"— Explain.

   (b) "Route caching can reduce route discovery overhead in DSR"— Explain.   6+4

5. (a) How does the SPIN family of protocols address the basic challenges faced by flooding? Which one is more suitable for environmental monitoring : SPIN or Directed Diffusion? Justify your answer.

   (b) Discuss the problem of fluctuation in DSDV. Also suggest a solution to overcome this.

                                                    (5+1)+(3+1)

6. (a) Define Directed Acyclic Graph (DAG).

   (b) How is the link reversal algorithm used in a DAG to explore multipath routes towards destination? Explain with an example.

   (c) What advantages and disadvantages does multipath routing have?

   (d) Do you suggest a network where this technique performs better than others? Give reasons.

                                                 1+6+2+1

7. (a) Consider the following WSN scenarios and explain why you would choose either a proactive or a reactive routing for the given use cases :

     (i) 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.

     (ii) 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) Describe the classical looping problem in Distance Vector. How is it solved in DSDV? Discuss.

                                                 4+(3+3)

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