C   **Reg. No. :**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Professional Elective

Electronics and Communication Engineering

21ECV307- SMART SENSOR NETWORKS

(Regulations 2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Reconfigurable sensor nodes which are_____.   CO1-U

   (a) Self-aware   (b) Self-reconfigurable

   (c) autonomous   (d) All of the above

2. SQTL organize the sensor data in nodes by_____.   CO1-U

   (a) hierarchical clustering   (b) attribute-based naming

   (c) a spreadsheet paradigm   (d) All of the above

3. _____Signal is transmitted by the sensor node equipped with GPS to   CO1-U
   determine unknown node location

   (a) Beacon   (b) non-beacon   (c) Both a & b   (d) None of the above

4. _____technique creates and maintain a data cache to be   CO1-U
   used for local loss recovery and in-sequence data delivery.

   (a) PSFQ   (b) ESRT   (c) CODA   (d) All of the above

5. _____power management is used to shut down devices when they are not   CO1-U
   needed and wake them when necessary

   (a) Active   (b) Idle   (c) Both a & b   (d) None

PART – B (5 x 3= 15 Marks)

6. Specify the technology fields that must advance and mature for collaborative CO1-U
   network processing of sensor signals.

7. Specify the TinyDB query to collect the average temperature from each   CO3-App
building.

8. Compose a query to identify the region where the temperature exceeds 100   CO4-App
degrees Celsius.

9. Classify the transport protocol depending on the data rate adjustment.   CO1-U

10. Examine the aspects that have an impact on a network's lifespan   CO1-U

<div align="center">PART – C (5 x 16= 80 Marks)</div>

11. (a) Illustrate how a network resource manager is utilized in sensor   CO1-U   (16)
networks, which need to be highly fault tolerant, reliable in gathering
data, performing in real time, and being autonomous.

<div align="center">Or</div>

(b) (i) Describe the feasibility of rebinding and remapping operations on   CO1-U   (16)
other processors in a real-time computer while isolating the
problematic processor.   (8m)
(ii) Examine the different approaches of sensor node to engage in
communication for the data transfer.   (8m)

12. (a) A user from a state emergency management agency may send a   CO3-App   (16)
query to the flood sensor database. For the next three hours, retrieve
every 10 minutes the maximum rainfall level in each country in
southern California, if it is greater than 3.0 inches. Write a SQL
Query to fetch the data from flood sensor database and discuss it.

<div align="center">Or</div>

(b) Assume a sensor network is installed in the northeastern quadrant of   CO3-App   (16)
the forest to monitor empty bird nests and tell me every hour if the
number of empty nests exceeds a threshold of 10. Create a SQL
Query for the above scenario and elaborate it.

13. (a) Develop a SQTL script for the coordinated vehicle tracking   CO4-App   (16)
algorithm.

<div align="center">Or</div>

(b) Design a wireless sensor network for forest fire detection and   CO4-App   (16)
illustrate it.

14. (a) Design a reliable and energy efficient transport protocol to meet the   CO2-App   (16)
needs of emerging reliable data applications in sensor networks.

<div align="center">Or</div>

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(b) Assume that 100 motes with minimum battery lifetime are placed in a crop field which form clusters and transfer the sensor data (temperature, Humidity and moisture level) to sink. Design an energy efficient routing protocol to improve the life time of a wireless sensor network.　　CO2-App　(16)

15. (a) Elaborate the idle power management states with neat diagram.　　CO1-U　(16)

Or

(b) Elucidate System-level power savings from active power management using DVS.　　CO1-U　(16)

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