JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION- 2016
B.Tech. VIII Semester

COURSE CODE: 15B1WCI831 MAX. MARKS: 15
COURSE NAME: Wireless Sensor Networks: Protocols and Applications
COURSE CREDITS: 3 MAX. TIME: 1 HR

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

1. High density networks are networks in which many sensor devices are in close communication range of each other.
   a) When the density of sensor nodes in an area is getting too high, several problems will arise. Illustrate those problems?
   b) How can we handle the high density sensor networks problems? Describe.

   [1.5x2=3]

2. (a) How to put sensor nodes together to form meaningful networks? Illustrate the various design principles of WSN.

   (b) Why multi-hopping is more energy-efficient than direct communication?

   [1.5x2=3]

3. Differentiate between traditional networks, MANET and WSN in terms of Quality of Service, Energy Efficiency, scalability and robustness.

   [3]

4. (a) How different operational modes of sensors are useful for design of protocols in WSN?

   (b) With required diagram explain the single node hardware and software architecture of WSN.

   [1.5x2=3]

5. Consider the following model describing the required energy E(A,B) to send a packet from node A to node B: $E(A,B) = d(A,B)^{\alpha}$. Here, d(A,B) is the distance between node A and B and α is a system parameter with $\alpha>2$. Assume that we are allowed to place a number of equidistant relay nodes between source node S and destination node T. Here, relay nodes serve as intermediate nodes to route packets from S to T. For instance, if S and T would use relay nodes A and B, the message would be sent from S to A, from A to B and finally from B to T.

   How much energy would be consumed in transmission and receiving an 8-bit packet at each node when the energy supplied to each node is 3 Joules. Also find the total energy consumption in the network?

   [3]