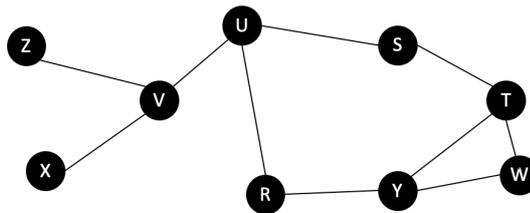**11   Mobile and Sensor Systems (cm542)**

(*a*)   Describe the differences between proactive and reactive ad hoc routing protocols.
[3 marks]

(*b*)   Consider the following routing table for mobile node U in an ad-hoc network:

| Dest | Next Hop | Number of Hops |
|------|----------|----------------|
| X | V | 2 |
| V | V | 1 |
| Z | V | 2 |
| S | S | 1 |
| R | R | 1 |
| Y | R | 2 |
| T | S | 2 |
| W | R | 3 |

For the mobile nodes snapshot illustrated here:



(*i*)   How would the routing table for node U be updated by the Destination Sequenced Distance Vector (DSDV) routing protocol, after node Y runs out of battery and disconnects from the network? [Assume no other nodes move in that time interval]. [3 marks]

(*ii*)   Now consider the scenario where node Z needs to communicate to node T regularly, but no other nodes communicate. How would you modify the routing protocol? Are there other considerations which would impact the choice of protocol to use? [4 marks]

(*iii*)   Consider routing nodes STYW from the original mobile node snapshot moving out of reach of nodes ZVURX. Node S and Y are intermittently moving back in range of the latter cluster. Node Z still needs to communicate regularly with T. What protocol would you use? Illustrate the considerations that would drive your choice of protocol. [5 marks]

(*iv*)   Now assume that the nodes depicted in the diagram above are fixed sensors, instead of mobile nodes. Node Y is a sink and all other nodes forward data to it. Explain why the mobile routing solutions of the previous answers are not suitable. Suggest a more appropriate protocol, describing its principles and advantages in this scenario. [5 marks]