Issues in Designing MAC Protocol for Ad-hoc Wireless Networks:

- ***Bandwidth Efficiency:***
  - Since the radio spectrum is limited, the bandwidth available for communication is also very limited. The MAC protocol must be designed in such a way that to maximize this bandwidth efficiency (the ratio of the bandwidth used for actual data transmission to the total available bandwidth).
  - That is the uncommon bandwidth is utilized in an efficient manner.
- ***Quality of Service Support(QoS):***
  - Providing QoS support to data sessions in Ad-hoc networks is very difficult due to their characteristic nature of nodes mobility.
  - Most of the time, Bandwidth reservation made at one point of time may become invalid once the node moves out of the region.
  - The MAC protocol for Ad-hoc wireless networks that are to be used in such real-time applications must have resource reservation mechanism take care of nature of the wireless channel and the mobility of nodes.

Issues in Designing MAC Protocol for Ad-hoc Wireless Networks:

- ***Synchronization:***
  - The MAC protocol must take into consideration the synchronization between nodes in the network.
  - Synchronization is very important for bandwidth (time slot) reservations by nodes achieved by exchange of control packets.
- ***Hidden and Exposed Terminal Problems:***
  - The hidden terminal problem refers to the collision of packets at a receiving node due to the simultaneous transmission of those nodes.
  - The exposed terminal problem refers to the inability of a node, which is blocked due to transmission by a nearby transmitting node, to transmit to another node.
- ***Mobility of Nodes:***
  - This is a very important factor affecting the performance (throughput) of the protocol.
  - The MAC protocol obviously has no role to play in influencing the mobility of the nodes.

Issues in Designing MAC Protocol for Ad-hoc Wireless Networks:

- ***Error-Prone Shared Broadcast Channel:***
  - Due to broadcast nature of the radio channel (transmissions made by a node are received by all nodes within its direct transmission range) there is a possibility of packet collisions is quite high in wireless networks.
  - A MAC protocol should grant channel access to nodes in such a manner that collisions are minimized.
- ***Distributed Nature/Lack of Central Coordination***
  - Ad hoc wireless networks do not have centralized coordinators because nodes keep moving continuously.
  - Therefore, nodes must be scheduled in a distributed fashion for gaining access to the channel.
  - The MAC protocol must make sure that the additional overhead, in terms of bandwidth consumption is not very high.