1. Differentiate between WANs and LANs.
   1. **The differences between a WAN and a LAN is quite simple. A WAN stands for a wireless area network. It is used to provide internet as well as other services. On the other hand, a LAN connection is used for grouping computer systems and network components together to use them internally.**
2. Why is it useful to have more than one possible path through a network for each pair of stations?
   1. **It is useful to have more than one possible path through a network just in case of failure. It also helps enhance the reliability of the network.**
3. What is the principal application that has driven the design of circuit-switching networks?
   1. **The design of the circuit switching network has been driven by the principal application called the telephone network. The dedicated path between the two stations is a connection of a sequence of links between them.**
4. Distinguish between static and alternate routing in a circuit-switching network.
   1. **Static routing is the route that involves the usage of a predetermined route between two endpoints. Also, to handle the overflow, possible backup routes are used. For alternate routing, this routing method involves the usage of multiple routes between two endpoints. The choice of routes can depend on the traffic conditions and the time of day.**
5. What is a semipermanent connection?
   1. **A semipermanent connection is a connection to a user set up by prearrangement. In different situations the connection can be used differently. In CS, it can be used to establish a data transfer.**
6. What data rates are offered for ISDN primary access?
   1. **Two basic channels of 64 Kbps and one data channel of 16 Kbps.**
7. Explain the difference between datagram and virtual circuit operation.
   1. **In datagram, every packet is independently treated, and there is no reference to packets that are transferred before, but in a virtual circuit operation, before sending any packets a predetermined route is established. Also, all packets between the communications stations or nodes follow the same predetermined route through the network.**
8. What are some of the limitations of using a circuit-switching network for data transmission?
   1. **Some limitations are that most of the time a typical host-to-terminal communication line will be idle. Also, the connections are offered at a constant data rate, which can limit the utility of the network in connecting a variety of terminals and host computers.**
9. What is the difference between a virtual channel and a virtual path?
   1. **Each virtual circuit is identified jointly by VCI and VPI along its path. The separation between virtual channels and virtual paths is mainly for the purpose of reducing networking management complexity. Normally, when two end users have multiple connections going through the same path, then they are using several virtual channels multiplexed into a single virtual path. So in some sense, the virtual channel represents the detailed channel identification while the virtual path represents the overall connection identification.**