Tutorial 5:
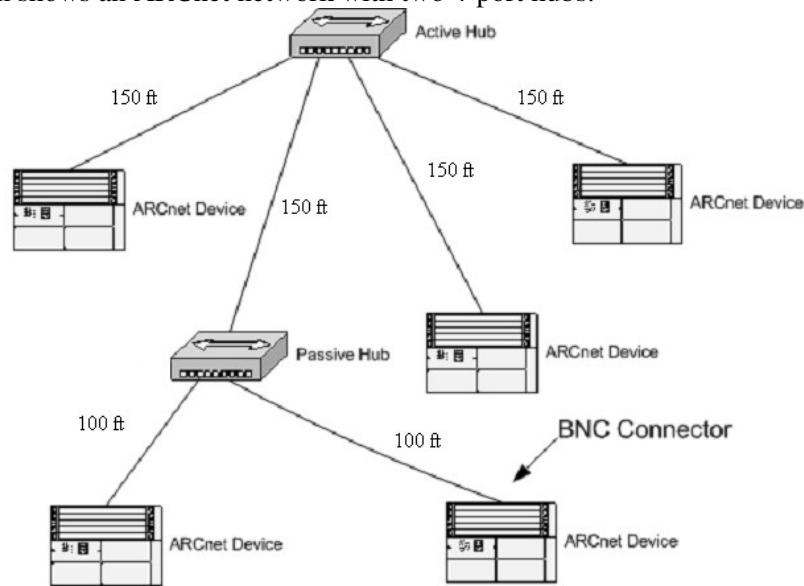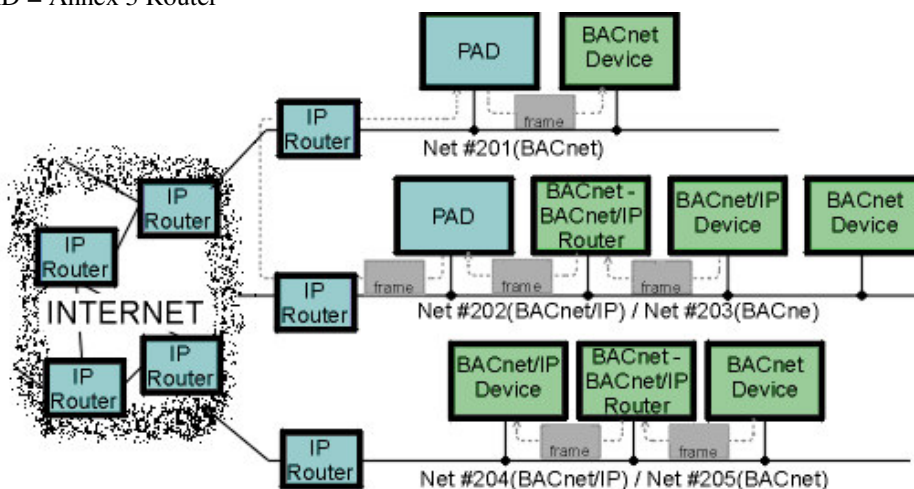
1. The diagram shows an ARCnet network with two 4-port hubs:

The network fails to work.
   a) Point out the two mistakes made by the network designer.
   b) Having corrected the mistakes described in part (a), you still find that the network is out of service. What can you do?

2. a) Describe the difference between the CSMA methods used by LonWorks and EIB.
   b) For a LonWorks network with the estimated backlog of 5, what is the probability of two packets colliding?

3. a) What are the two methods used to connect BACnet networks over IP?
   b) Amongst the two methods in part (a), which one is suitable to connect an existing BACnet networks to an IP internetwork? Briefly explain how it can be done.

4. The following diagram illustrates a BACnet networks mixing BACnet and BACnet/IP devices:
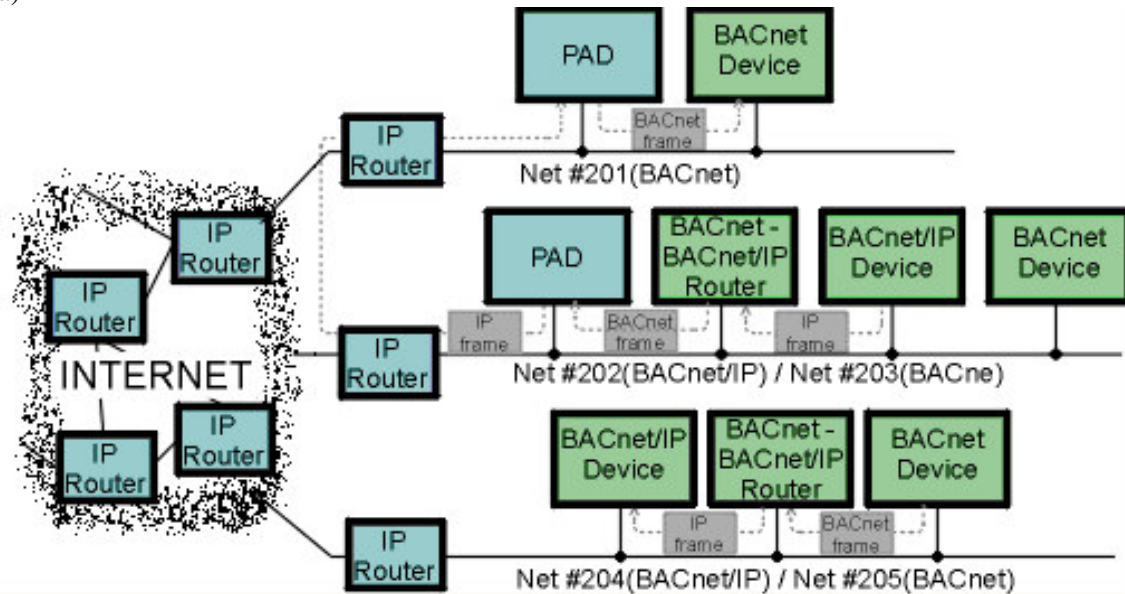   * PAD = Annex 3 Router

   a) Identify the type of data frame (IP or BACnet) in the six grey areas.
   b) How can BACnet devices communicate with BACnet/IP devices?
   c) How can BACnet/IP devices communicate with PAD devices?
   d) Suggest a physical layer suitable for this network.

More reading on BACnet: http://www.alerton.com/Products/BACtalk/About_BACnet/Articles/default.asp

Solution Guide:

11. a) Exceed specifications of cable lengths: less 100 ft between active hub and passive hub
       Missing 93 ohms terminator in the passive hub
   b) Check (1) duplicate addresses, (2) active hub failure and (3) bad connectors.

12. a) EIB page 7 and LonWorks page 7.
   b) 1/(5*16) = 1/80 = 0.0125

13. BACnet page 14 and 15

14. a)

b) BACnet and BACnet/IP devices cannot communicate directly with each other. Their messages must be routed through a BACnet-to-BACnet/IP router.

c) BACnet/IP devices cannot communicate directly with PAD devices. To join BACnet/IP devices to a system using PADs and BACnet devices, a BACnet-to-BACnet/IP router must be on the same directly-connected BACnet internetwork as one of the PADs.

d) Ethernet with two BACnet network numbers: one for the BACnet devices and another for the BACnet/IP devices.