IT 340 – Network Management
Assignment No. 4

Due Date: 17/04/2016
Total Marks: 10 (Final mark out of 5)

Question No. 1[1 point]
What is a foreign agent and explain its relationship with the home agent.

Answer :

In Mobile Internet Protocol (Mobile IP), a foreign agent is a router serving as a mobility agent for a mobile node. As specified in IETF RFC 2002), a foreign agent works in conjunction with another type of mobility agent known as a home agent to support Internet traffic forwarding for a device connecting to the Internet from any location other than its home network.

Question No. 2[3 point]
Give three differences between Multichannel Multipoint Distribution Service (MMDS) and Local Multipoint Distribution Service (LMDS).

Answer :

MMDS has a range between BSs is 50 km but LMDS Covers 5 km radius.

MMDS operates over 2.5 to 2.686 GHz band but LMDS operates over 27-28.35 and 31-31.3 GHz bands.

LMDS is sensitive to rain attenuation. MMDS uses multi-channels.

Note that MMDS as well as LMDS have a Point-to-multipoint architecture.

Question No. 3 [1 point]

If a total of 33MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25kHz simplex channels to provide full duplex voice and control channels. Calculate the number of channels available per cell if a system uses 4-cell reuses.

Answer1:

The question is general and students are required to determine the number of channels available (not only for data) so the response will be 33 MHz / 50 KHz = 660 channels in total, we have 4 cells so 165 channels per cell

Answer2: If the students take into account the bandwidth for control channels

Total bandwidth=33MHz

Channel bandwidth=25 kHz×2 simplex channels=50 kHz/duplex channel

Total available channels = 33000/50 = 660 channels.

A 1 MHz spectrum for control channels implies that there are 1000/50 = 20 control channels out of the 660 channels available.

In practice, only the 640 voice channels would be allocated since the control channels are allocated separately as 1 per cell.

Here, the 640 voice channels must be equitable distributed to each cell within the cluster.

For $N = 4$, we can have 5 control channels and 160 voice channels per cell. In practice, however, each cell only needs a single control channel (the controls have a greater reuse distance than the voice channels). Thus, one control channel and 160 voice channels would be assigned to each cell.

Question No. 4 [1 point]

a- What do broadband access networks aim for?
b- Give four main existing technologies of broadband access networks

Ans.

Broadband access network aim for providing high-speed access of home networks and businesses to the WAN. They support transfer of data, voice and video.

There are, mainly, four access network technologies:
- ❖ Cable technology: transmits data over hybrid fiber-coaxial cables. It is popular in North America
- ❖ ADSL : It is more extensively deployed elsewhere in the world. It transmits data over copper telephone lines.
- ❖ Wireless technology using radio communication
- ❖ PON : Passive optical network , transmits data over optical fiber medium

Question No. 5 [3 point]

Answer these questions shortly:

a. What is a splitter for ADSL ?
b. What is a configuration profile for an ADSL interface?
c. What are the possible modes of configuration profile ?

Ans.

a. Splitter (ADSL) : a network device that separates voice and data

b. What is a configuration profile for an ADSL line? A configuration profile for an ADSL line consists in the set of values that configuration parameters take for that line. These parameters include line type, noise margin and rate thresholds.

c. What are the possible modes for configuration profile?
   There are two possible modes for configuration profile:
   - the dynamic mode (mode-I):in this mode, several ADSL lines can be configured to share common profiles. It is helpful to manage a great number of ADSL lines.
   - The static mode (mode -II): in this mode, each ADSL line has its own static configuration profile

Question No. 6 [1 point]

A half-duplex channel is carrying a 4 Mbps signal. Calculate the bandwidth of the channel in Hertz for the following modulated signals:

a. QPSK
b. 16-QAM

a- 4/2=2MHz (QPSK → 2 bits per symbol)
b- QAM requires 4 bits per symbol so bandwidth = 4/4 = 1 MHz