
UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2006/2007

April 2007

**EEE 521 – COMPUTER AND DATA COMMUNICATIONS
NETWORKS**

Duration: 3 hours

Please check that this examination paper consists of FOUR pages of printed material before you begin the examination.

This paper contains SIX questions.

Instructions: Answer **FIVE (5)** questions.

Answer to any question must start on a new page.

Distribution of marks for each question is given accordingly

All questions must be answered in English.

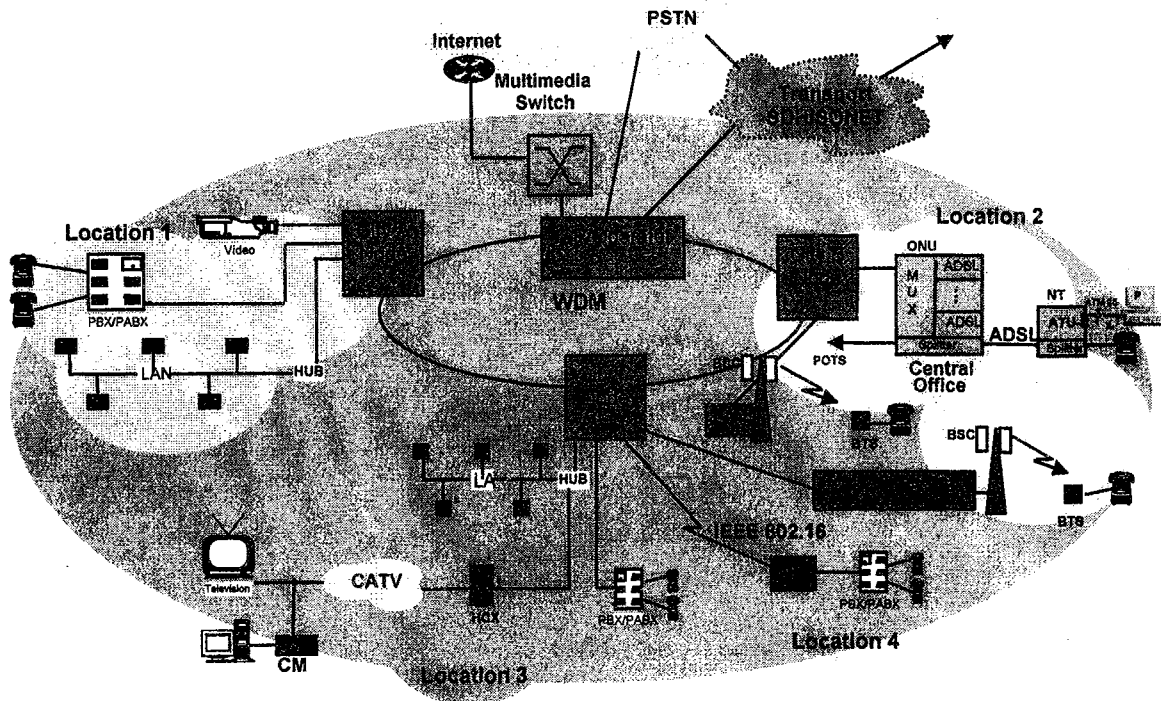


Figure 1

3 (three) cities, each with around 100,000 inhabitants, are connected via a WDM, as described in Figure 1. The requirements for each city are as follows:

City A : applications of video, PBX and LAN:

City B : connecting people at home with broadband copper wire technology ADSL, a well as some cellular transmission for suburban areas

City C : fixed wireless access, PBX connected to a Wireless MAN (WiMax, IEEE 802.16), PBX with PSTN connection and a HFC network for CATV and LAN connections.

All the signals will be transferred to telecommunication network operator(s)/provider(s), connected to outside PSTN and Internet.

1. VOICE, DATA AND VIDEO COMMUNICATIONS (CITY A)
 - (a) Explain the integration of a PSTN and a LAN. (25%)
 - (b) Compare the PSTN and LAN at every TCP/IP layer. (50%)
 - (c) How can the video application be integrated to the network? (25%)

2. BROADBAND FIXED COPPER AND WIRELESS ACCESS (CITY B)
 - (a) Elaborate the network protocols from ADSL for each layer of TCP/IP. (30%)
 - (b) Explain about the broadband wireless access with 3G mobile network. (30%)
 - (c) Explain the integration of both systems in the network (40%)

3. HFC AND PSTN (CITY C, LOCATION 3)
 - (a) Elaborate the network protocols from HFC for each layer of TCP/IP. (35%)
 - (b) Explain about the data communication facilities of an HFC network. (35%)
 - (c) Explain the integration of an HFC and a PSTN network. (30%)

4. WIMAX AND MOBILE COMMUNICATION

- (a) Compare the WiMax and GSM/3G at every TCP/IP layer (50%)
- (b) Explain the integration of both networks. (25%)
- (c) How can a WiLAN system be integrated into those networks? (25%)

5. WDM

- (a) Explain the functionality of WDM. (50%)
- (b) Explain the integration of each city to the WDM network (50%)

6. OPTICAL FIBER BROADBAND BACKBONE

- (a) Explain the various optical fiber broadband backbone communication network (50%)
- (b) How is the integration to the PSTN and Internet? (25%)
- (c) What is a Multimedia Switch? (25%)