Instructions: Do your homework on your own. Some of the problems will require additional thought. It is more important to have your own opinion on the problems and argue along, than copying from someone else's answer sheet. You will get extra credit for doing 2(c) and (d).

1 Delay Model (30pt)

Suppose a 10 Mbps KT-VDSL line from your PC to switch number 1 (namely, S1) with distance 1km and 1 Gbps Ethernet from switch number 1 (S1) to switch number 2 (S2) with distance 5km. From switch number 2 (S2), there are two links: a 11 Mbps IEEE 802.11b wireless connection to host number 1 (H1) with distance 20m and a 100 Mbps Ethernet to host number 2 (H2) with distance 1km. 10/100 Mbps links use twisted wire for their medium, 1 Gbps Ethernet uses optical fiber, and wireless LAN uses air for its medium.

Answer the followings (You don’t need to calculate):
(a) Assume that there is no delay at S1 or S2. What is the latency you expect when sending K-byte packet from your PC to H1? (10pt)
(b) With the same assumption as in (a), what is the latency from your PC to H2? (10pt)
(c) How much extra delay should a 1500-byte-long packet experience at S2 if there are 5 1500-byte-long packets already in the queue? (10pt)
2 Network Performance (20pt+)

Exercise #30 on p.60 on
(a) File Server (10pt)
(b) Digital Library (10pt)
(c) VoIP (10pt*)
(d) Streaming music video through June service (SK-Telecom) (10pt*)

*2(c) and (d) are only for those who want extra credit.

3 Cyclic Redundancy Check (15pt)

Exercise #20 on p.153
(a) (9pt)
(b) (6pt)

4 Ethernet Capture Effect (40pt)

Exercise #44 on p.159 (40pt)

5 Bluetooth (30pt)

Bluetooth is one of the major wireless technologies in today’s market. Answer the followings:
(1) How is Bluetooth different from IEEE 802.11b? Give at least five examples. (25pt) (2) Which wireless technology (Bluetooth or IEEE 802.11) do you think will dominate in the future? Back up your opinion with solid arguments. (5pt)