

OLLSCOIL NA hÉIREANN
THE NATIONAL UNIVERSITY OF IRELAND, GALWAY

SEMESTER II EXAMINATIONS 1999/2000

CT425

Advanced Communications

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Time Allowed: Two Hours

Answer 3 Questions

1. Houses in medium sized town are to be connected to the local cable TV provider. This company intends to offer a number of services to its clients these are-

- i) Cable TV – 20 channels
- ii) Video on demand
- iii) Video telephone System for the town
- iv) Normal telephone system
- v) Internet access

What are the band-width and switching limitations of this system. What functions could be carried out using B-ISDN?

2. Write a short essay on two of the following:
- i) GSM small packet services
 - ii) Protocols for connecting supercomputers
 - iii) Low-earth-orbit broad-band satellite systems
 - iv) Security for Mobile Computer Systems
 - v) Infra-Red Communication Devices

Finally, compare the impact your two systems will have on the developing area of electronic and computer assisted commerce.

3. What are the strengths and weaknesses of the DES algorithm?

In order to protect its main customer base an on-line bookshop, nile.com, uses a Certification Authority to authenticate its main customers. Could such a system be used to authenticate all its customers? nile.com's security manager proposed the following sequence to authenticate and secure transactions – what is wrong with his scheme and how would you improve it?

Client-Side

Data From Customer → Authentication → Encryption → Compression → Tx

Server-Side

Rx → Decompression → Decryption → Authentication → Database Request

4. As the system manager for a Health Board you have been asked to install a distributed security system, which would allow a number of different groups of users to have access to the system. These range from administrators who can have access to personnel and accounting records, but not patient records; medical staff who can have access to patient record records, but not personnel and accounting information. Patients can have access to the system for public health warnings and a simple system for self-diagnosis. Access to the system can be made through the Internet and through dedicated terminals which are geographically spread. What security systems would you put in place to ensure that this system can run with both bespoke and commercial software and ensuring that confidential information remains so.
5. The University's computer systems are vulnerable to hackers. Contrast measures that can be taken to restrict access to both the Unix and NT systems. If you suspect that a hacker has gained entrance to the system what techniques could you use to detect both the presence and location of the intruder. Both staff and students require the ability to log into the University's systems from within College and from anywhere in the world.