

NAPIER UNIVERSITY
SCHOOL OF COMPUTING

FIRST DIET (SEMESTER TWO) EXAMINATION

SESSION 2000-2001

MODULE: EE42005

COMPUTER ENGINEERING

DATE:

DURATION: 3 HOURS

START TIME:

EXAMINER(S)

**DR. A. ARMITAGE
DR W.BUCHANAN**

QUESTION PAPER DATA

**Number of pages - XX
Number of questions - 6
Number of sections - ONE**

INSTRUCTION TO CANDIDATES

Attempt any FOUR questions.

PLEASE READ THE FULL INSTRUCTIONS BEFORE COMMENCING WRITING

1. (a) Explain the main types of cache architecture, and contrast their operation. (10)
- (b) Outline the states of the MESI protocol which is used in cache control, and highlight the requirement for it, and for each of the states. (15)

Total Marks [25]

2. (a) Contrast the basic operation of EDO DRAM, Burst EDO DRAM, DDR DRAM, FPM and SDRAM. (12)
- (b) Explain the architecture and operation of Direct RDRAM, and highlight the main design decisions that must be taken. (13)

Total Marks [25]

3. (a) Contrast the architecture of hub-based architecture (such as the 840 chipset) with traditional north/south bridge architecture (such as with the 430 chipset). Outline the main signal lines for north/south bridge architecture. (10)
- (b) For a PC with PCI, AGP, SCSI, ISA and RDRAM interfaces, derive the data transfer requirements for each of the interfaces. State all assumptions made. How does the data rate vary for different implementations of these interfaces (15)

Total Marks [25]

4. (a) Explain how a SCSI device uses the free -bus, arbitration and selection phases to gain access to the bus.

(12)

(b) Outline, giving an example, how arbitration is implemented on the PCI bus. Explain how the PCI support the locking of targets, and also why are locks necessary?

(13)

Total Marks [25]

5. (a) Outline a set of best practices for creating a high-security network. (8)
- (b) Explain how a firewall could be used to create a secure network, and outline the parameters in TCP data segments and in IP data packets which the firewall would filter with. (10)
- (c) Explain the operation of an encryption tunnel using public-key encryption to create a secure connection. (7)

Total Marks [25]

6. (a) Illustrate the different layers of the OSI 7-layered model, and provide an example of each layer. Also, with reference to the OSI model, identify the function of the three lower layers and discuss the function of the repeaters, bridges and routers. (13)
- (b) Outline the operation of the HTTP protocol and how WWW caches are used in the transfer of WWW pages. What advantages does a cache-based system have over one without caches? Also explain why a WWW client knows that the file has been received correctly, or not. (12)

Total Marks [25]

END OF PAPER