

UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

Foundation Year Examination 2012

COMPUTING AND INFORMATION SYSTEMS

IS50004A (FY04)

Study Skills and Introduction to the Use of Computers

Duration: 2 hours 15 minutes

Date and time:

There are five questions in this paper. You should answer no more than THREE questions. Full marks will be awarded for complete answers to a total of THREE questions. Each question carries 25 marks. The marks for each part of a question are indicated at the end of the part in [.] brackets.

There are 75 marks available on this paper.

Electronic calculators must not be programmed prior to the examination. Calculators which display graphics, text or algebraic equations are not allowed.

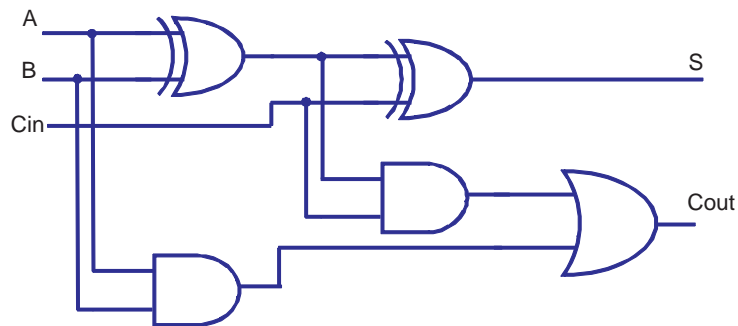
**THIS PAPER MUST NOT BE REMOVED FROM THE
EXAMINATION ROOM**

QUESTION 1

- (1) Given the 8-bit binary sequence 10111101_2 , find its corresponding decimal (base 10), hexadecimal (base 16) and octal (base 8) values.

[8 Marks]

- (2) Given the following circuit diagram:



- (a) List the logic gates used and their truth tables.

[4 Marks]

- (b) Draw the truth table for this circuit showing its input (A, B, Cin) to output (Cout, S) relationship.

[4 Marks]

- (c) What function does this circuit perform?

[4 Marks]

- (d) Using a block diagram show how this component can be replicated to form larger circuits.

[5 Marks]

QUESTION 2

- (1) Compare the following different types of memory in terms of speed, cost and size: CPU registers, cache memory, main memory, magnetic discs, optical discs and magnetic tapes.

[5 Marks]

- (2) Explain how data is transferred from a magnetic disc (i.e. floppy disc) to the main memory.

[6 Marks]

- (3) (a) Explain and state the advantages and disadvantages of the following memory management schemes:

- (i) Swapping
- (ii) Simple paging
- (iii) Demand paging

- (b) What are the advantages of a bigger page-size over a smaller one?

[14 Marks]

QUESTION 3

(1) Name three of the main components of a CPU and briefly describe their functions.

[3 Marks]

(2) (a) List four responsibilities of an Operating System as resource manager.

[4 Marks]

(b) Briefly describe and contrast the following mechanisms of implementing input/output:

- (i) Programmed I/O
- (ii) Interrupt Driven I/O
- (iii) Direct memory access (DMA)

[9 Marks]

(3) (a) Explain the need of a cache memory.

(b) Explain how the cache memory uses temporal locality to improve a computer's performance.

[9 Marks]

QUESTION 4

(1) Name the seven layers defined in the OSI Reference Model.

[7 Marks]

(2) Explain how flow control is achieved in the TCP/IP model and state which layer is responsible for this.

[6 Marks]

(3) (a) Explain the concept of subnetting and state why it is needed.

(b) Given the following IP address and subnet mask:

IP Address: 130.40.33.17

Mask: 255.255.248.0

Which class of network does this belong to? What are the subnet and the host addresses? What is the number of possible hosts in this subnet?

[12 Marks]

QUESTION 5

(1) Explain the difference between the following Malware:

- (a) Viruses
- (b) Worms
- (c) Trojan Horses

[6 Marks]

(2) List three ways in which a computer virus can enter a computer system. Describe two techniques used by anti-virus software to identify a malicious code.

[6 Marks]

(3) With reference to the Data Protection Act of 1998, describe:

- (a) The role of the Information Commissioner
- (b) What is meant by a data subject

[5 Marks]

(4) Discuss the claim that “hackers” aren’t the people who are going to destroy the Internet; in fact they could be the only ones who can save it.

[8 Marks]