

UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

Department of Computing

B. Sc. Examination 2013

IS50004A

Introduction to the Use of Computers

Duration: 2 hours 15 minutes

Date and time:

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*There are four questions in this paper. You should answer **all four** questions. Full marks will be awarded for complete and correct answers to a total of four 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 100 marks available on this paper.*

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

**Question 1** Storage Devices

- (a) For each of the following pairs of quantities, state whether they are the same, or if not, which of the pair is *larger* (assuming the strict meanings of SI prefixes): [10]
- i. 10MB, 10MiB;
  - ii. 8Kib, 1KiB
  - iii. 1000kb, 1024Kib
  - iv. 10TB, 1000GB
  - v.  $2^{13}$ b, 1KiB
- (b) i. Compare magnetic, optical and solid-state disk drives with respect to size, cost and operating characteristics. [6]
- ii. Suggest advantages and disadvantages to the use of digital storage in libraries and archives. [4]
- (c) Briefly explain the boot process of an operating system, covering the steps following powering on the computer to the point where it is ready for use. [5]

**Question 2** Computer Architecture

(a) With the assistance of a diagram, describe the relationships between the following components of a system: [10]

- i. hardware
- ii. firmware
- iii. kernel
- iv. standard library
- v. applications

(b) i. Copy and complete the following truth table for the NAND and the OR logical operations. [4]

A	B	A NAND B	A OR B
0	0		
0	1		
1	0		
1	1		

ii. Draw a logic gate diagram for the implementation of the OR relation for two inputs using only NAND gates. [6]

(c) Copy and complete the following truth table for one-bit multiplication, and hence name the logic gate which can be used to implement a one-bit multiplier. [5]

A	B	A×B
0	0	
0	1	
1	0	
1	1	

**Question 3**     Networking

- (a) Name and illustrate *three* network topologies, illustrating the physical layout of nodes and their connections. [10]
- (b)
  - i. Explain what function the Domain Name System (DNS) has in the context of host names and IP addresses. [3]
  - ii. Explain what function the Address Resolution Protocol (ARP) has in the context of IPv4 and Ethernet. [3]
  - iii. Name and briefly describe the protocol used for sending of electronic mail on the Internet. [4]
- (c) Explain why in some circumstances web browsers will display unintended accented characters or reverse-video question marks, and what can be done to prevent this. [5]

**Question 4**      Computers and Society

- (a) i. Describe the legal concepts of patents and copyrights. [4]
- ii. State, with a brief explanation, whether patents, copyrights, both, or neither are likely to affect the following activities: [6]
- running legally-purchased programs on a computer;  
    producing products with similar functionality to existing ones;  
    ‘ripping’ audio content from CDs to hard disks.
- (b) i. Describe the effects of having a ‘rootkit’ running on a computer system. [4]
- ii. Give one example of a rootkit known to have been deliberately installed by a large corporation on end-user machines. [3]
- iii. Which piece of UK legislation outlaws the unauthorized installation of rootkits? Explain your answer. [3]
- (c) Describe similarities and differences between the technique known as ‘phishing’ and the delivery of ‘trojans’. [5]