THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS

Certificate

TECHNOLOGY

19th April 2006, 2.30 p.m.-4.30 p.m. Time: TWO hours

SECTION A

Both Section A and Section B carry 50% of the marks. You are advised to spend about 1 hour on Section A (30 minutes per question) and 1 hour on Section B (12 minutes per question).

SECTION A

Answer TWO questions out of FOUR. You are advised to spend about 1 hour on Section A (30 minutes per question)

All questions carry equal marks.

The marks given in brackets are *indicative* of the weight given to each part of the question.

- 1. A microprocessor consists of functional units such as an ALU, registers, and buses.
 - *a)* Describe the structure of a typical (but simplified CPU) that is able to read instructions from memory and execute them. (10 marks)
 - b) By means of diagrams show how an instruction is fetched from memory and executed. Explain the role of all registers, functional units, and buses taking part in this activity. Comment briefly on the reason that this activity is called a 'fetch-execute' cycle'.
 (20 marks)
- 2. Email has been one of the greatest successes of the Internet. Email allows you to communicate with people or even large groups of people almost anywhere in the world nearly instantaneously.

Unfortunately, a considerable burden has been placed on the Email system by the large numbers of unwanted Emails, collectively called SPAM.

- a) Discuss why SPAM is such a problem today and describe its effects on the Email system. (10 marks)
- b) Discuss some of the ways in which SPAM may be defeated (including both technological and social or legal mechanisms).
 (15 marks)
- *c)* Describe some of the legal and ethical problems that arise when people attempt to deal with the threat posed by SPAM. (5 marks)

3. In the 1980s the microcomputer was expensive and its performance, peripherals and storage capacity were very poor compared with today's high-performance personal computers.

Today's very high-performance personal computer with its wide range of advanced peripherals (e.g., printers, scanners, wireless networks) enables people to perform sophisticated computer-based activities anywhere in the world.

- *a)* Explain how and why a modern computer allows you to 'perform sophisticated computer-based activities anywhere in the world'. (10 marks)
- b) Describe any THREE modern computer peripherals (excluding very simple peripherals such as the keyboard and mouse) and explain how their characteristics have improved over the years. You must briefly explain the improvement in operating principles of the peripherals you choose to describe. You should also give the approximate characteristics (i.e. operating parameters) of the peripherals you describe. (20 marks)
- **4.** A high-performance computer employs several different memory subsystems, each of which uses a different storage technology (e.g., DRAM, flash memory, magnetic memory and optical storage).
 - *a)* Explain why computer manufacturers do not use one single memory technology. (7 marks)
 - b) Describe the characteristics (brief principles of operation, speed and capacity, cost) of a hard disk.

(18 marks)

c) What are the principal differences between the hard disk drive and a recordable DVD drive *from the user's point of view*? (5 marks)

SECTION B

Answer FIVE questions out of EIGHT. You are advised to spend about 1 hour on Section B (12 minutes per question).

All questions carry equal marks.

The marks given in brackets are **indicative** of the weight given to each part of the question.

5. Carry out the following operations showing all workings:

a)	Convert $9D6_{16}$ to binary and octal	(3 marks)
b)	11100111 ₂ XOR 01111111 ₂	(3 marks)
c)	$BC_{16} + AB_{16}$	(3 marks)
d)	10101011 ₂ AND 11111001 ₂	(3 marks)

6. Briefly describe the difference between hypertext transfer protocol and hypertext mark-up language. Explain how each of the techniques is used. (12 marks)

7.	In the context of networking, differentiate between the following pairs of terms:		
	<i>a</i>)	router and switch.	(6 marks)
	b)	DTE and DCE	(6 marks)

8.	TCP/IP is a suite of <i>communication protocols</i> for connecting <i>hosts</i> on the Internet. In this context, describe t following terms:		
	a) communication protocols and hostsb) IP address	(6 marks) (6 marks)	
9.	Electronic Commerce (E-Commerce) has become very popular in the last few years. Describe the internet has impacted on the development of E-Commerce.	e and explain how (12 marks)	
10.	 a) What is a Universal Serial Bus (USB)? b) Explain the importance of the USB in the modern Personal Computer. 	(6 marks) (6 marks)	
11.	 With reference to wireless computing, explain each of the terms below: a) Wi-Fi b) Bluetooth technology c) PDA 	(3 x 4 marks)	
12.	Describe and explain each of the concepts: <i>a)</i> system registry (as available in Microsoft Windows TM , for example)	(6 marks)	

b) multitasking, multithreading and multiprocessing.

(6 marks)