IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
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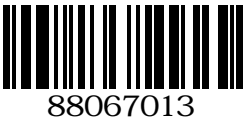
N06/5/COMSC/SP1/ENG/TZ0/XX



COMPUTER SCIENCE
STANDARD LEVEL
PAPER 1

Wednesday 15 November 2006 (afternoon)

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Section A: answer all the questions.
- Section B: answer all the questions.

SECTION A

*Answer **all** the questions.*

1. Outline **one** reason why a sorting routine would be employed as an intermediate stage in the processing of payroll. *[2 marks]*

2. Suggest **two** ways in which the introduction of a microprocessor into the design of a car could improve its safety features. *[2 marks]*

3. (a) Define *secondary memory*. *[2 marks]*

(b) Describe a situation in which secondary memory could be used as an extension of primary memory. *[2 marks]*

4. Identify the data structure that would be most suitable for the processing of the following sets of data:

(a) rainfall data for several cities for each month of a year *[1 mark]*

(b) personnel data for the employees of a company. *[1 mark]*

5. Explain how the use of *check sums* could ensure that *data integrity* is maintained during the transmission of text. *[3 marks]*

6. Outline how the width of the address bus is related to the amount of memory stored in the CPU. *[2 marks]*

7. Identify **two** possible reasons for the need for the *maintenance stage* of the software cycle. *[2 marks]*

8. Define the term *register*. *[2 marks]*

9. Outline **two** reasons for the choice of MICR (Magnetic Ink Character Recognition) for the processing of cheques. *[2 marks]*

10. Banks make extensive use of computer systems in the running of their operations. Identify a situation in which banks would make use of each of the following types of processing:

(a) real-time *[1 mark]*

(b) batch *[1 mark]*

(c) interactive. *[1 mark]*

11. Identify **two** security measures that would be used in a Local Area Network (LAN). *[2 marks]*

12. An 8-bit register is used to represent integers in two's complement.

For example:

0	0	1	0	1	1	1	0

is the representation of 46_{10}.

Determine the binary representation and calculate the decimal value of

(a) the largest number that can be stored. *[2 marks]*

(b) the smallest (most negative) number that can be stored. *[2 marks]*

SECTION B

*Answer **all** the questions.*

13. A school has decided to implement a local area network (LAN) for use by students, teachers and administrative personnel. It will choose between a star network and a bus network as the network topology.

(a) Compare these **two** topologies for use in the school. *[4 marks]*

The school also wishes to provide Internet access from their LAN.

(b) Identify **two** possible communications links that would provide high-speed Internet access for the school. *[2 marks]*

The network will be linked to a central server, on which students' files, teachers' files and students' records will be stored.

(c) Discuss how different levels of access could be assigned to the different users on this network. *[4 marks]*

14. Consider the following program segment:

```
C = !A&&B;
if (C)
     statement 1;
else
     statement 2;
```

(a) State the type of variable that `C` must be. *[1 mark]*

(b) By choosing suitable values for `A` and `B`, explain how the use of parentheses, in the first line of the program segment, could alter the program flow. *[4 marks]*

(c) Identify the type of error that would arise from the misplacing of parentheses in the first line of the program segment. *[1 mark]*

(d) Describe a method that the programmer could use to help to identify such an error. *[4 marks]*

15. A bank is considering updating its computer system and has requested a feasibility study.

(a) State **two** reasons why the bank might decide **not** to go ahead with the design of the new system after receiving the feasibility report. *[2 marks]*

The bank goes ahead with the updated system, which it introduces in parallel with the old system.

(b) Compare this choice of implementation with an alternative implementation strategy that the bank could have chosen. *[4 marks]*

This updated system will allow the bank to implement an Internet banking service in a developing country, which has a large rural population.

(c) Discuss the social consequences of the implementation of such a system. *[4 marks]*

16. A computer user regularly downloads large graphic files over the Internet for use on a home computer.

(a) Identify **three** pieces of software (apart from the operating system) that must be installed on the computer for this use. *[3 marks]*

The graphics card in the user's computer uses 1 byte to represent each pixel on his colour monitor.

(b) Explain how this graphics card might affect the quality of the graphics that appear on his monitor. *[3 marks]*

The user upgrades the graphics card, but remains dissatisfied with the computer's performance.

(c) Suggest, with reasons, **two** other ways that the user could improve the graphics handling capabilities of this computer. *[4 marks]*