Diploma Programme
Programme du diplôme
Programa del Diploma

Information technology in a global society
Standard level
Paper 1

Thursday 3 May 2018 (afternoon)

1 hour 30 minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer two questions. Each question is worth **[20 marks]**.
- The maximum mark for this examination paper is **[40 marks]**.

7 pages

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Answer **two** questions. Each question is worth [20 marks].

1. **IT support for staff laptop computers at *RZX***

   The role of the IT department at *RZX* is to provide IT support to the staff at the head office. As many of the employees spend a considerable amount of time travelling between the various *RZX* offices, they are given a laptop computer. This laptop needs to be maintained once a year, so each employee must hand in their laptop before they go on vacation so that this can be done. The IT team will carry out the maintenance and have it ready for the employee when they return from their vacation.

   Employees at *RZX* are expected to store their files in the cloud. However some employees have saved many files on their laptops, and *RZX* has informed them that they are responsible for keeping secure backups of this information.

   During maintenance, hard disk drives are cleaned, defragmented or reformatted and the random access memory (RAM) is increased. A new version of the operating system may be installed and other software programs will be added, re-installed or upgraded to a newer version.

   [Source: © International Baccalaureate Organization 2018]

   (a) (i)   Identify **two** functions of an operating system.   [2]

   (ii)   Identify **two** characteristics of random access memory (RAM).   [2]

   (iii)   Identify **two** devices that could be used to store a backup of the files that employees have saved on their laptops.   [2]

   (b)   Analyse the advantages and disadvantages of using cloud-based storage for an *RZX* employee's work files.   [6]

   (c)   The disposal of old IT equipment is becoming a problem. *RZX* is considering two options:
   •   donating the equipment to a charitable organization
   •   sending the equipment to a recycling service.

   Evaluate the implications of these **two** options.   [8]

2. Medical centre budgets

Dr Schultz is the head doctor and manager at the Okavango Medical Center, Botswana.
This medical centre is located eight hours away from the capital city, Gaborone. The medical centre is able to cope with routine cases, but when the doctors at the centre encounter an unusual case they have to communicate with specialists at the main hospital in Gaborone using either a telephone or voice over internet protocol (VOIP).

Currently the Okavango Medical Center does not have any medical equipment connected to the IT systems at the hospital in Gaborone in real time. When there are unexpected changes in a patient's condition, this makes it hard to give the necessary information to specialists in Gaborone. Because of this, at times Dr Schultz has to ask a specialist doctor from Gaborone to come to Okavango Medical Center to carry out treatment.

The area is becoming popular with tourists, and Dr Schultz is concerned that the doctors and nurses at Okavango Medical Center will be unable to treat the increasing number of patients. He believes Okavango Medical Center needs better equipment in order to improve patient care.

Dr Schultz created a spreadsheet of the treatments carried out by the centre over a week. A small part of the spreadsheet is shown below in **Figure 1**.

Figure 1: Part of Dr Schultz's treatment record spreadsheet

	A	B	C	D
	C10	fx	Emergency	
1	Doctor	Gender of patient	Procedures	Day
2	Dr Schultz	F	Surgery	MON
3	Dr Gerber	F	Surgery	MON
4	Dr Schultz	M	Emergency	MON
5	Dr Gerber	M	Surgery	MON
6	Dr Gomez	M	Check-up	MON
7	Dr Schultz	F	Follow-up	MON
8	Dr Gerber	M	Follow-up	MON
9	Dr Tirbau	F	Emergency	MON
10	Dr Schultz	F	Emergency	MON
11	Dr Gomez	F	Check-up	MON
12	Dr Tirbau	M	Surgery	TUE
13	Dr Schultz	M	Check-up	TUE
14	Dr Gomez	F	Emergency	TUE
15	Dr Gerber	M	Emergency	TUE

[Source: © International Baccalaureate Organization 2018]

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(Question 2 continued)

(a)   (i)   Identify **two** characteristics of voice over internet protocol (VOIP).   [2]

      (ii)   Identify the steps that Dr Schultz must follow to list only the surgeries carried out
             by Dr Tirbau using the spreadsheet software.   [2]

      (iii) Identify **two** reasons why Dr Schultz would use a spreadsheet instead of a
             database for record keeping.   [2]

(b)   Dr Schultz has arranged to speak to the local authorities in an attempt to get more
      funding for the medical centre. He intends to use presentation software to create
      a slideshow to support this speech. Dr Schultz is aware that many people in the
      audience are annoyed when slideshows are poorly designed.

      Explain **three** design errors Dr Schultz should avoid when creating his slideshow for
      the local authorities.   [6]

(c)   The Okavango Medical Center has received additional funding from the local
      authority. The centre is investigating the possibility of using these funds to purchase
      IT equipment that would allow surgeons in Gaborone to carry out surgery remotely.

      Evaluate the impact of the purchase of this IT equipment on the medical centre and
      its patients.   [8]

Turn over

3. **Digital currency**

Bitcoin is a type of digital currency (cryptocurrency). This is money that can be sent via the internet and exchanged for goods, services or money in different currencies. Users can buy Bitcoins using real money, and then Bitcoins can either be spent or stored in a digital wallet for later use. Bitcoins can be used in every country, and sending Bitcoins is as simple as sending an email.

The Bitcoin wallet is an application that can be installed on a computer or mobile device. Once a Bitcoin wallet is installed, the user will get a Bitcoin address to use when transferring Bitcoins to and from the wallet. This transfer uses private and public key encryption. Users should have a strong password to access their Bitcoin wallet.

Bitcoin operates on a peer-to-peer (P2P) network and users of Bitcoins are identified by their Bitcoin address. Some users of Bitcoins wish to remain anonymous, but this is not always possible.

[Source: © International Baccalaureate Organization 2018]

(a) (i) Identify **two** characteristics of a peer-to-peer (P2P) network. [2]

(ii) Identify **two** characteristics of a strong password. [2]

(iii) The use of a password is one method of authentication.

Identify **two** other methods of authentication. [2]

(b) (i) Explain **one** reason why Bitcoin makes use of private key and public key encryption. [2]

(ii) Explain **one** reason why it may be difficult to ensure the security of information in a large peer-to-peer network such as Bitcoin. [2]

(iii) Some users of Bitcoins are concerned that their anonymity may be compromised by their Bitcoin address.

Explain **one** way the Bitcoin address may be used to reveal information about a Bitcoin user. [2]

(c) Bitcoin is a form of digital currency. Bitcoin transactions are made between individuals without the knowledge of banks, governments or credit card companies. Some governments are investigating whether they should regulate digital transactions, such as those made using Bitcoins.

To what extent is it appropriate for governments to regulate digital transactions, such as those made using Bitcoins? [8]

4. Implementation of a new information system

Savoree is a company located in Quito, Ecuador, that prepares desserts for schools and offices. The business has grown, and it now has a commercial kitchen where all the desserts are produced.

Savoree needs a new information system to keep track of its business, and has hired *TecniCo* to design this new system. *TecniCo* needs to understand how the business works so it can propose an adequate IT solution.

[Source: © International Baccalaureate Organization 2018]

(a) (i) Identify **four** ways that *TecniCo* could gather data about the present situation. [4]

 (ii) *TecniCo* will provide a list of requirements for the solution proposed.

 Identify **two** categories of information that should be included in the requirements specification provided by *TecniCo*. [2]

(b) The managers at *TecniCo* need to decide whether to use open source or proprietary software to develop the new information system for *Savoree*.

 Analyse these **two** options. [6]

(c) *Savoree* is looking to expand its business. To make this possible, *Savoree* is considering whether to open an online shop. Customers will be able to see products and make online purchases.

 Discuss whether *Savoree* should provide an online shop as a way to expand its business. [8]