



MARKSCHEME

May 2011

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Higher and Standard Level

Paper 1

10 pages

*This markscheme is **confidential** and for the exclusive use of examiners in this examination session.*

*It is the property of the International Baccalaureate and must **not** be reproduced or distributed to any other person without the authorization of IB Cardiff.*

Examiners should be aware that in some cases, candidates may take a different approach, which if appropriate should be rewarded. If in doubt check with your Team Leader.

In the case of an “identify” question read all answers and mark positively up to the maximum marks. Disregard incorrect answers. In the case of a “describe” question, which asks for a certain number of facts *e.g.* “describe two kinds”, mark the **first two** correct answers. This could include two descriptions, one description and one identification, or two identifications. In the case of an “explain” question, which asks for a specified number of explanations *e.g.* “explain two reasons”, mark the **first two** correct answers. This could include two full explanations, one explanation, one partial explanation, *etc.*

1. (a) (i) **The percentage marks in column C are calculated by the spreadsheet using a formula. Identify the formula used in cell C4.** [1 mark]

Answers may include:

- =B4/40
- =(B4/40).

N.B. Must include a cell reference. Equals sign is optional.

Award [1 mark] for any of the above points up to a maximum of [1 mark].

- (ii) **Identify the type of formatting that has been applied to the formulae in the range (C4:C9).** [1 mark]

Answers may include:

- right-aligned
- percentage
- number of decimal places is zero.

Award [1 mark] for any of the above points up to a maximum of [1 mark].

- (b) **The grades in cells D4 to D9 are produced automatically by the spreadsheet. Describe how the spreadsheet has been set up in order to generate these grades.** [4 marks]

Answers may include:

- get the mark
- look it up somewhere or ref to **lookup** (vlookup) or as part of an **if** function
- location of lookup values (reference to (A12:B19) or (A13:B19) or clear reference to the correct values in an **if** function)

*N.B. The marks can be part of the **if** function or alternatively referenced to the appropriate cells in the lookup table.*

- compare (mark with lookup values) (this can be expressed using an operator such as \leq)
- get/insert grade.

Award [1 mark] for any of the above points up to a maximum of [4 marks].

- (c) **The teacher uses a macro to plot a chart showing these results. Explain why macros are a useful way to generate output such as charts from a spreadsheet.** **[4 marks]**

Answers may include:

- output is standardized
- chart or other output is produced automatically
- no need to remember commands
- no need to remember formats/chart types used
- can incorporate annotations automatically
- can edit macros to publish the chart in a word processed document
- the job can be given to someone else
- fewer mouse clicks/key strokes/idea of saving time or effort/improved efficiency/ useful for repetitive tasks
- macros can be edited/fine tuned.

There is no need to explicitly mention charts in the response.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2–3 marks]

A reasonable description, although the answer may lack appropriate reasoning at the lower end of the band. The candidate shows awareness of macros as a means of automation.

[4 marks]

A clear, detailed explanation of the issue with reasons. The candidate shows understanding of why a macro can save effort or lead to better quality output. The answer is logically and coherently argued.

2. (a) **Drop-down boxes have been used to capture two of the data items on the form. Identify *two* reasons why drop-down boxes are often used to capture data from on-screen forms.** *[2 marks]*

Answers may include:

- quicker / easier / more efficient input
- prevents entry of unacceptable values
- consistent data entry.

Award [1 mark] for any of the above points up to a maximum of [2 marks].

- (b) **The error message at the base of the screen highlighted two errors when the user inputted data to this form. Describe the steps taken by the system to identify these two particular errors.** *[4 marks]*

Answers may include:

- today's date is generated by (operating) system/look up today's date in system clock/calendar
- allowable date in the future is stored
- checks date entered against allowable date / today's date
- date must not be beyond a specific date / in the future.

Award [1 mark] for any of the above points up to a maximum of [2 marks].

Answers may include:

- checks currency entered/selected
- looks up exchange rate in its database
- if system does not have relevant rate, looks for exchange rate entered by the user
- check if exchange rate field is blank.

Award [1 mark] for any of the above points up to a maximum of [2 marks].

- (c) **The organization has stopped using its old paper-based system and its staff must now use the new online system. Explain what the organization should do to make sure that all the users are ready to make full use of the new system.** **[4 marks]**

Answers may include:

technical

- check that users' systems are compatible (*i.e.* software to perform a compatibility check)
- reference to any software tool to do this
- reference to system requirements
- software thoroughly tested by organization/developers
- beta testing with some users.

training and support

- provide training for staff
- method(s) to do this, *e.g.* online training, instruction provided by an on-site trainer
- easy to follow instructions on web site or sent out to users
- easy to follow error messages
- prompts for each stage on web site.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2–3 marks]

A reasonable description, although the answer may lack appropriate reasoning at the lower end of the band. The candidate shows awareness of testing or training.

[4 marks]

*A clear, detailed explanation of the issue with reasons. The candidate shows understanding of testing **and** training. The answer is logically and coherently argued.*

3. (a) Define the term *resolution* when referring to an image. [2 marks]

Answers may include:

- a measure of the quality/clarity
- number of pixels per unit area or distance/pixel **density**
- reference to amount of data in the image file.

Award [1 mark] for any of the above points up to a maximum of [2 marks].

- (b) (i) Identify *two* disadvantages of converting the file pigeon1.PNG into the file pigeon2.JPG. [2 marks]

Answers may include:

- lose print quality/clarity/resolution/any statement that shows awareness of data loss
- cannot go back to the original image with the same quality
- scaling image produces unacceptable results
- time delay when decoding and displaying JPG
- **repeated** compression and decompression loses **more** data each time.

Award [1 mark] for any of the above points up to a maximum of [2 marks].

- (ii) Describe *one* technique used in image conversion software that would enable the conversion of the file pigeon1.PNG into the file pigeon2.JPG. [2 marks]

Answers may include:

- correct reference to compression
- parts of image that are least likely to affect perception are removed / data removed
- colour analysed
- degree of data loss can be chosen.

Award [1 mark] for any of the above points up to a maximum of [2 marks].

- (c) **Explain why photo sharing web sites will not allow users to upload large image files to them.** **[4 marks]**

Answers may include:

- users often upload huge numbers of files
- large files take up more bandwidth
- may slow web site down/slow downloads
- may crash the web site
- large files take up more storage space
- less space available for other users
- cost issues.

N.B. That answers must relate to the web server/site provider and not the user's computer.

[1 mark]

A limited response that indicates very little understanding of the topic.

[2–3 marks]

A reasonable description, although the answer may lack appropriate reasoning at the lower end of the band. The candidate shows awareness of storage or bandwidth.

[4 marks]

*A clear, detailed explanation of the issue with reasons. The candidate shows understanding of storage **and** bandwidth. The answer is logically and coherently argued.*

4. (a) Identify *two* features of a “strong” password. [2 marks]

Answers may include:

- both letters and numbers used
- mixture of upper and lower case letters
- non-alphanumeric characters used
- personal information not used
- not easy to guess/real words
- sufficient length.

Award [1 mark] for any of the above points up to a maximum of [2 marks].

- (b) Identify the steps that a “brute force” attack could use to try out all the possible passwords to a computer system. [4 marks]

Basic marking plan – look for the following ideas about a brute force attack:

- start point identified
- a systematic approach/repetition/try alternatives
- end point (repeat until found or locked out).

Additional mark points for more detail:

- check that a password is present
- start with a first letter / lower case / upper case
- match against all possible first letters
- add in a second letter
- match against all possible combinations.

N.B. Reward other possible step by step approaches, if they are systematic. Reject random approaches. Reject manual approaches.

Award [1 mark] for any of the above points up to a maximum of [4 marks].

- (c) Trojan horses and keystroke loggers (often called keyloggers) can be used by hackers to intercept passwords when bank customers access their accounts online. Explain *two* methods a bank can use to prevent customers' passwords from being intercepted in these ways. *[4 marks]*

Answers may include:

- never require a complete password (*i.e.* only require random parts of a password)
- use drop-down boxes to capture parts of passwords
- do not require passwords to be typed in (*e.g.* select with a mouse from a screen-based keyboard) – this avoids their capture by keystroke loggers
- one time passwords
- guidance from bank (however supplied)
- biometric authentication
- encryption – **only if it is clear that it is between the keyboard and the computer**
- **reject https encryption**
- **reject second level authentication.**

N.B. Answers must relate to prevention of keylogging, not general security measures.

Award [1 mark] for identifying each method up to a maximum of [2 marks]. Award an additional [1 mark] for the description of each method up to a maximum of an additional [2 marks].
