UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2006 question paper

0420 COMPUTER STUDIES

0420/01   Paper 1, maximum mark 100

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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1   Generally, one mark for each valid point. Two examples gain two marks.

(a) *smart card*
integrated chip card
data held in tiny silicon chip
replaces the need for magnetic stripes
harder for criminals to copy/change data
used by banks, mobile phones, satellite TV receivers   **[2]**

(b) *relational database*
contents of files are linked/data held in a number of interrelated files or relations
linked by common fields
uses tables   **[2]**

(c) *read-only memory (ROM)*
non volatile memory
used to store systems software
read from but not written to
cannot change   **[2]**

(d) *de-skilling*
skilled/semi skilled labour
replaced by microprocessor-controlled systems
e.g. manufacturing   **[2]**

(e) *top down design*
breaking down the problem/task/program
into sub problems/smaller tasks/modules
stepwise refinement   **[2]**

2   Any **two** features

download screen savers
receive text messages
internet
caller display
PIN code
range 59 m indoors, 300 m outdoors
clear signal   **[2]**

3   **(a) One** effect from

fraud/transferring money
viewing sensitive confidential data
changing data
sell data
virus/logic bomb
blackmail   **[1]**

(b) Two ways from

passwords/codes
encryption
monitoring attempts to access the system/logging use
lock keyboard/computer/doors
firewalls
smart card
fingerprints/biometrics
restrict access
set up false web sites   **[2]**

4 Any **three** file management tasks from e.g.

    load/save
    sort
    merge
    de-fragment
    delete
    calculate file size/space left
    automatic backup
    directories **[3]**

5 **(a)** Any **two** ways from e.g.

    on-line teaching/testing
    multimedia presentation
    interactive board
    use internet – access web sites e.g. see expert systems demo
    video conferencing **[2]**

  (b) Any **two** ways from e.g.

    e-mail/file attachments
    send document as a FAX using computer
    put on bulletin board
    put on school web site
    use ISP messaging facility
    use ISP texting facility **[2]**

6 **(a)** Any **two** advantages from e.g.

    H L similar to English
    H L easy to understand
    Easy to correct errors/test
    problem orientated
    portable **[2]**

  (b) Award **one** mark for example and **one** mark for reason

    example e.g.   operating system
                    game

    reason   fast
                    1 → 1 with machine code
                    no need to compile/uses assembler **[2]**

7 **(a)** B7:B12, E3   **[1]**

(b) Select B7:E13,
Format, Cell, Currency   **[2]**

(c) **=**SUM(B7:B12) or (B7+B8+B9+B10+B11+B12)   **[1]**

(d) =B7/2 or B7* 0.5   **[1]**

(e) C10:E10   **one** mark
B13:E13   **one** mark   **[2]**

(f) B6:E6   **one** mark
B13:E13   **one** mark   **[2]**

8 **(a)** **One** from

probe/sensor
AD converter   **[1]**

(b) **Two** from

data stored in computer database
compared with set parameters
compared with previously stored readings   **[2]**

(c) **Two** from

graph
database table   **[2]**

(d) alarm   **[1]**

(e) **Two** from

readings are taken automatically
accurate measurements are made
no human error
readings are taken at exactly the right time   **[2]**

9 **(a)** 1   **[1]**

(b) $\xleftarrow{\quad 10, 5, \quad}$ $\xleftarrow{\quad 16, 8, 4, 2, 1 \quad}$
        one mark   **one** mark   **[2]**

10 **(a) Two** from

less staff/employment costs/queues in the bank
can close branches/less costs for maintaining branches
less paper/electronic transactions **[2]**

(b) Two from

need to have/be able to use devices capable of accessing the internet
security risks
cannot have the personal service offered by the conventional bank
cannot get cash **[2]**

(c) Three from

the data must be up-to-date
the data can only be used for the purpose for which it was collected
data must be accurate
data must be destroyed when no longer needed
data user must register what data is stored and the use
data must be used fairly and lawfully
data must be protected from accidental damage
only authorised people can have access to that data
hackers are prosecuted
fines are imposed data is misused **[3]**

11 **(a)** Any **two** from

interviewing/asking questions
questionnaires
observing
inspecting files/paper/screens **[2]**

(b) Any **two** from

cost/benefit analysis
any conflict between requirement and law
development time
does technology exist/is it practical
description of business plus problems
part of business being looked at e.g. processing of orders
objectives of the proposed system
alternative solutions and why others were rejected
do the staff have the expertise to cope with the new system/enough money to go ahead/technology available
plan for implementation
course of action/how to proceed **[2]**

(c) Any **three** from

decide on   software
                  hardware

design   input formats
                  output formats
                  file structures/tables
                  test plan
                  flow charts/algorithms
                  processing   **[3]**

(d) Any **one** from

direct changeover
parallel conversion
phased conversion
pilot conversion   **[1]**

12 (a) <u>Data type</u>
Date is DATE, others are text/alphanumeric/string   **one** mark

<u>Field length</u>
Date of birth = 8   **one** mark

Others = 30
E-mail = 40   **one** mark

<u>Validation</u>
Date is DATE, Picture/Format Check, Length Check, Range Check
Others are Type Check
<u>Or</u> all are Presence Check   **one** mark   **[4]**

(b) Award **one** mark each

appropriate heading
all 6 fields present
clearly not a hand written form
sufficient spaces for data
icon/hyperlink/hot spot on screen   **[5]**

(c) Award **one** mark

two people can have same name   **[1]**

(d) One mark

e.g. change of address/phone number/e-mail address/marry   **[1]**

(e) random/direct access   **[1]**

13 (a) Any **three** from

'faults' input
knowledge base searched
using inference engine/rules
solution(s) suggested
knowledge base contains knowledge of experts   **[3]**

(b) Award **one** mark each

medical diagnosis
geological surveys - oil and mineral deposits
construction industry - quantity surveyor costings
mineral prospecting
social services - calculate benefit
financial services - predict stock market movement/recommend investments
speech recognition
chess
forensic science   **[2]**

14 (a) Award **one** mark each

large volume of data
off-line preparation
no immediate urgency for batch of data to be processed
instant processing/immediate results not required
computer used for other jobs   **[2]**

(b) Award **one** mark each

          validate   errors

  validated transaction file

  sorted transaction file

          update
                      [6]
  master file

(c) Award **one** mark per point

use of grandfather/father/son (or backup)
re-run old master file with transaction file
follow disaster recovery plan   **[2]**

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15 **(a)** Any **four** from

    3D views
    rotation
    modifying stored drawings
    automatic calculations
    cross sections
    surface area
    volume
    simulation   **[4]**

(b) Any **one** from

    flexible manufacturing
    product changes can be made quickly
    product changes can be made inexpensively
    manufacturer can respond quickly to current demands
    can make modifications to products without the delay of change in setup   **[1]**

16 **(a)** 20   **[1]**

(b) Award **one** mark for each correct step in the algorithm

Initialise	**one** mark
Loop (30)	**one** mark
Input ID, weight, height	**one** mark
IF………THEN………ELSE	**three** marks
(<u>or</u> CASE OF……….OTHERWISE)	
Calculate BMI	**one** mark
Output ID, BMI and comment	**one** mark **[6]**