This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners’ meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2012 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
<table>
<thead>
<tr>
<th></th>
<th>A Microphone</th>
<th>B Webcam</th>
<th>C Remote control</th>
<th>D Number pad</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>buzzer</th>
<th>DVD R</th>
<th>joystick</th>
<th></th>
<th>magnetic tape</th>
<th>plotter</th>
<th>touch pad</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>A scanner is used to enter a PIN</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Word processing software is used to write letters</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Database software is used to create newspapers</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>A command line interface uses icons to represent applications</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Sensors are used to monitor physical variables</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Abnormal</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>twenty</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>✓</td>
</tr>
</tbody>
</table>
5 Three pairs from:
Hub
Broadcasts data packets to computers in a LAN

Router
Connects LANs to a WAN/Internet

Switch
Directs data packets to specific computers

NIC
Enables computers to be connected to a network

Bridge
Connects networks/LANs together/Directs data packets to specific networks

Proxy server
Stores web pages for faster re-use by computers/can act as a firewall

Modem
Modulates data and demodulates phone signals

6

<table>
<thead>
<tr>
<th></th>
<th>LAN</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses wireless technology to transmit data</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Faster transmission of data</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Greater security</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Is cheaper as there is less cabling</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

7 PEN DOWN FORWARDED 300

RIGHT 90 PEN DOWN

REPEAT 8 REPEAT 6

FORWARDED 100 FORWARD 80

LEFT 45 LEFT 60

END REPEAT END REPEAT

PENUP

1 mark for each correct statement
8 A Blu-ray disc is used to store high definition copies of movies.
A graphics tablet is used to retouch photographs.
An inkjet printer is used to print out photographs.
A motor is used to open windows in a greenhouse.
An Optical Mark Reader is used to input candidate examination answers. [5]

9 Three from:
If computer is switched off work in RAM goes but backing storage stores data for future use.
More likely that data is accidentally deleted in RAM.
RAM is more expensive than backing storage per unit of memory.
RAM is bulkier than backing storage per unit of memory.
RAM provides faster access than backing storage.
Software package may be so large that it is physically impossible for RAM to store it.
Data may need to be transferred from one computer to another and can’t do that with RAM. [3]

10 (a) Three from:
Temperature sensor
Light sensor
pH sensor
O₂ sensor
CO₂ sensor [3]

(b) Five from:
The sensors feed back data to microprocessor/computer.
Data is converted from Analogue to Digital.
Readings from A are compared with those from B...
.....by the computer/microprocessor.
Differences are printed out.
Graphs are automatically produced by computer showing values from A and B...
....plotted against time.
Process is continuous. [5]

11 (a) Four from:
User interface
Rules base
Knowledge base
Inference engine [4]

(b) Two from:
Engine car fault diagnosis
Prospecting
Tax
Careers
Chess games
Animal/plant classification [2]
12 Three pairs from:
   Length check
   Checks there are exactly 16 characters

   Invalid character/type check
   Checks all characters entered are digits

   Check digit
   Single digit calculated from other digits appended to these, computer carries out fresh calculation on digit and compares answer with original check digit.

   Existency check
   Is the card number on the database [6]

13 RSI in the wrists – caused by repetitive typing/prolonged gripping of mouse [1]
   RSI in the fingers – caused by repetitive clicking of mouse [1]
   Headaches – staring at the screen for too long [1]
   Back pain – sitting in the same position for long periods [1]

14 Three matched triples from:

   User ID and password
   Benefit – each user ID could be unique/only user will know the password/data can only be accessed by person who knows the password/Password can be changed frequently to avoid hackers guessing them/Unsuccessful logins can throw you out of the system
   Drawback – user might forget password/keylogging software can be used to intercept it

   Biometrics
   Benefit – each user has unique biometrics
   Drawback – equipment is expensive to buy/may be difficult or expensive to get equipment to user

   Magnetic/chip card with PIN
   Benefit – Hacker needs to have the card and know the PIN
   Drawback – can lose the card/can forget PIN

   TAN
   Benefit – Always changing so a hacker would not be able to use it even if they intercepted it when user typed it in.
   Drawback – need to have card and remember PIN and use it within a short period of time. [9]
15  (a) Would always be the same contents/waste space putting in duplicated field  

(b) 

<table>
<thead>
<tr>
<th>Field name</th>
<th>Validation check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Must be Feisty or Mendo or Galactica</td>
</tr>
<tr>
<td>Colour</td>
<td>Must be red, blue or gold</td>
</tr>
<tr>
<td>Air conditioning</td>
<td>Boolean check - Must be yes or no</td>
</tr>
<tr>
<td>Number of doors</td>
<td>Range check &gt;2 AND &lt;6 / &gt;=3 AND &lt;=5</td>
</tr>
</tbody>
</table>

(c) Six from:

Verification is checking that data has been accurately copied from one medium to another. Verification does not check that data is correct
If original data is incorrect it will still be incorrect after it has been copied accurately
Verification does not check that data is correct
If, for example, data is incorrect but within a given range, a range check won’t reject it
Verification will pick up errors that validation does not
Verification will pick up errors that validation does not
Verification can sometimes be carried out by the user
Validation is always carried out by the computer

16  (a) Three from:

...in Sheet 1
Until it finds the value equal to the contents B2 (BAH) in sheet 2
B2 in sheet 2 contains BAH
It records the corresponding value from column 2 of sheet 1
Produces Bahamas

(b) Maldives

(c) Three from:

It looks through A8 to A18
Cell B2 contains the code BAH
Checks whether A8 to A18 contains the code BAH/contents of B2
Counts all the cells where there is a match
Produces the answer 3.

(d) 4
(e) **Four** from:

**Benefits**
- Real thing may be too expensive to build
- Real thing requires too large a time scale
- Real thing would be too wasteful of materials
- Real thing is too vast a scale
- Easier to change data/variables
- Costs less to change data/variables
- The real thing may be impossible to access/create
- Real thing may be too dangerous
- You can test predictions more easily/model can make predictions more accurately
- You can ask many whatif questions which would be impractical in real life

**Drawbacks**
- Can never allow for all eventualities
- Difficult to exactly recreate a lifelike situation
- Hardware and software may be expensive
- Workers will need to be trained to use the system

Max. 3 drawbacks or benefits  [4]