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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.
1 (a) 1 mark for each name of application + 1 mark for description of use

<table>
<thead>
<tr>
<th>Hardware item</th>
<th>Application and how the hardware item is used</th>
</tr>
</thead>
</table>
| Barcode reader      | Supermarket checkout  
|                     | – read barcodes to find prices, description  
|                     | – allows automatic stock control  
| Library system      |  
|                     | – can track books on loan  
|                     | – can link books to borrowers using barcoded cards  
| Airport checkouts   |  
|                     | – barcodes on luggage to track whereabouts  
| Microphone          | Voice recognition system  
|                     | – allows computer to recognise spoken words and use them as input to, e.g., a word processor  
| Multimedia presentations |  
|                     | – allows voice-overs on presentations  
| Video conferencing/VoIP |  
|                     | – allows users to speak to each other  
| Touch screen        | Mobile telephone/tablet  
|                     | – allows user to select apps/icons  
| Ticket/information kiosk |  
|                     | – easy method to input data  
|                     | – limits the options available for ease of use  
| Infrared sensor     | Burglar/intruder detection system  
|                     | – detects presence of a person by breaking beam/change of temperature  
| Automatic doors     |  
|                     | – breaking i/r beam allows detection of person approaching door  
| Counting, e.g. people/cars |  
|                     | – every time beam is broken it can automatically send data and allow automatic counting  

[8]
(b) Any two from:
- Blu-ray discs use blue/violet lasers rather than red lasers as used by DVDs
- Storage capacity of Blu-ray discs is much higher than standard DVDs
- Blu-ray discs use one polycarbonate layer; DVDs use two layers
- Blu-ray discs have a built-in secure encryption system

(c) Any two from:
- DVD has one spiral track; DVD-RAM has several concentric tracks
- DVD-RAM can be written to and read from at the same time; DVD-R only allows the read operation to occur
- DVD-R only allows data to be read (can't write to it) whereas DVD-RAM allows reading and writing operation

2 (a) 1 0 1 1 0 1 0 1

F 6

(b) Any two from:
- HTML
- MAC address
- Used in assembly language/machine code
- Debugging (displays bytes in hex when using memory dumps)

(c) – Can represent 16 bit words as only 4 hexadecimal digits
- It is easy to convert hex digits back to binary if necessary
3 (a) Statement | True | False
--- | --- | ---
Cookies can destroy or modify data in a computer without the user’s knowledge | ✓ | 
Cookies generate website pop-ups | ✓ | 
Cookies allow a website to detect whether a viewer has viewed specific web pages | ✓ | 

(b) Registers

Any two from:
- PC (Program Counter)
- MAR (Memory Address Register)
- MDR (Memory Data Register)
- CIR or IR ((Current) Instruction Register)
- ACC (Accumulator)

Buses

Any two from:
- control
- data
- address
- **Browser**: Signal sent to a processor which may cause a break in execution of the current routine, according to priorities.

- **HTML**: Software application used to locate, retrieve and display content on the World Wide Web, e.g. web pages, videos and other files.

- **Internet service provider**: Company that provides individual's access to the Internet and other services such as web hosting and emails.

- **Interrupt**: Hardware identification number that uniquely identifies each device on a network; it is manufactured into every network card and cannot be altered.

- **IP address**: Authoring language used to create documents on the World Wide Web; uses tags and attributes.

- **MAC address**: Location of a given computer/device on a network; can be a static or dynamic value.
5 (a) (i) Inkjet printer

Any **four** from:
- uses cartridges/liquid ink
- makes use of thermal bubble/piezoelectric technology
- sprays ink in droplets on the paper
- uses a moving print head
- suitable for low volume (high quality) output, e.g. a photo

(ii) Laser printer

Any **four** from:
- uses powdered ink/toner cartridges
- uses a (charged) printing drum
- makes use of static electricity charges
- uses a fuser to fix/melt ink onto the paper
- uses a discharge lamp to remove static charge from the drum
- useful for high volume (high quality) output, e.g. leaflets

(b) Any **three** from:
- produces solid, 3D objects/prototypes
- used in CAD/CAM
- makes use of tomography/slices of an object
- solid built up in thin layers
- uses resin, powdered metal, paper, plastic…

6 (a) Any **one** from:
- jumbling up/scrambling characters so that message makes no sense
- requires an encryption key to encrypt data
- need decryption key to decipher encrypted message

(b) Uses the same key to encrypt and decrypt message

(c) 1 mark for correct name in box

![Diagram of encryption process](plain text -> encryption algorithm -> cypher text)
7 (a) Lossy
- when decompressed, some detail is lost and file is not exactly like the original (but difference is usually not noticeable)

Lossless
- when decompressed the original file is restored with no loss of data

(b) 1 mark for type of file + 1 mark for description
e.g:
- JPG
  - Used to store images/pictures
- MP3
  - Used to store audio/sound files

(c) Any three from:
- company calculation is based on 1 GByte = 1000 MByte
  - so \((500 \times 1000)/8 = 62500\) files
- customer calculation based on 1 GByte = 1024 MByte
  - so \((500 \times 1024)/8 = 64000\) files
  - giving the difference of 1500 files

8 Any three from:
- provides a user interface
- input/output control/handling
- security
- (handling) interrupts
- spooling
- memory management
- processor management
- utilities (e.g. copy, save, delete, rename, etc.)
- maintain user accounts
- load/run software
- error reporting/handling
- multiprogramming
- batch processing/JCL
- multitasking
9 (a) Any one from:
- verification is being described
- validation is when data follows a set of rules, e.g. length/range/type check

(b) Any one from:
- send as JPEG files
- carry out a file compression first

10 (a)

<table>
<thead>
<tr>
<th>w</th>
<th>w</th>
<th>w</th>
<th>.</th>
<th>c</th>
<th>i</th>
<th>e</th>
<th>.</th>
<th>o</th>
<th>r</th>
<th>g</th>
<th>.</th>
<th>u</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>%77</td>
<td>%77</td>
<td>%77</td>
<td>%2E</td>
<td>%63</td>
<td>%69</td>
<td>%65</td>
<td>%2E</td>
<td>%6F</td>
<td>%72</td>
<td>%67</td>
<td>%2E</td>
<td>%75</td>
<td>%6B</td>
</tr>
</tbody>
</table>

1 mark 1 mark 1 mark

(b)

| W | W | W | . | r | o | c | k | i | c | t | . | c | o | m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| %77 | %77 | %77 | %2E | %72 | %6F | %63 | %6B | %69 | %63 | %74 | %2E | %63 | %6F | %6D |

1 mark 1 mark 1 mark
11 1 mark for each input device + 1 mark for correct MATCHING reason for each device

**Input Devices**

- Barcode scanner
  - ... to scan the barcode on boarding pass/mobile phone screen
- Keyboard
  - ... to key in data in case barcode fails to scan
- (Electronic) scales
  - ... weigh luggage at check-in

1 mark for each output device + 1 mark for correct MATCHING reason for each device

**Output Devices**

- Beep/speaker
  - ... confirm barcode read/indicate error if barcode not read
- (LCD) screen
  - ... select options (e.g. airline) at check-in
- Printer
  - ... produce bag labels

12 (a)

```
  1 1 1 1 1 0 0 0
0 0 0 0 1 1 1
```

(b) 1 mark for error detection method and 1 mark for description

- Check sum
  - ... sum of bits is transmitted and checked against the sum of the received bits
- Check digit
  - ... a digit that is calculated (e.g. using modulo-11) and transmitted with the data
- ARQ
  - ... when an error is detected in a packet of data a request is automatically sent for the data to be resent
13 (a) Firewall [1]

(b) Shareware [1] 

(c) SSL (secure socket layer) (accept HTTPS and TLS) [1] 

(d) MIDI [1] 

(e) Microphone [1]