Q1.

(a) (i) input device   [1]

   (ii) output device   [1]

(b) **(Any 2x2 input and 1x2 output, max 6)**   [6]

Input:

Bar code reader/laser scanner/light wand
- Scans the barcode
- recognises the thickness of bars
- to allow interpretation of code number of item

Keyboard
- to allow operator to input barcode/price/details
- in case bar code reader cannot read barcode
- to allow input of codes from items that have no printed barcode

Swipe card reader/chip reader
- to read data from card (credit/debit/bank)
- to send details of amount and customer to bank/computer

Output:

Printer
- to print till receipt

LCD

- to show purchase details/cost of item

Q2.

a.   2D scanner

b.   Barcode reader

c.   Microphone

d.   2D cutter

e.   LCD

f.   Actuator   [6]

Q3.

(a)

- Touch screen // key pad // buttons // sensors // joystick
- because space is limited // limited number of input options // built-in // method of control [2]

(b)

- Speaker/headphones // LCD // screen (ignore touch)
- to output sounds (in order to enhance the action) // to hear/see what is happening [2]

Q4.

-Black and white laser
    -e.g. Use in office to produce letters
    -Produces high quality/speedy so does not develop large queue on a LAN
-Colour laser
    -e.g. To produce reports for a meeting
    -High quality outputs/can produce large quantity quickly
-Dot Matrix
    - e.g. Print receipts at checkout/tickets on railway
    -Produces more than one copy at a time, one for customer + one for shop
-Inkjet
    -e.g. Doing homework at home
    -Relatively cheap and slowness does not matter
-Plotter
    -e.g. Produce architect's plans
    -Precision drawing tool
-Braille printer
    -Producing documents/books for blind people
    -Outputs physical/3D form of data
(3 per type, max 3 types, max 9) [9]

Q5.

(a)

QR/Quick response [1]

(b)

Any **four** from:
- Read/scanned using **app** (on mobile device)
- It is the **camera** that is used to scan/capture the image
- The three large squares are used to define the alignment // uses alignment targets/modules
- Black squares reflect less light // white squares reflect more light
- The app/device processes the image
- Each small square/pixel is converted to a binary value

[4]

Q6:

answer requires a different sensor for each part, 1 mark for each part

(i) temperature [1]

(ii) moisture, humidity, light/photodiode, temperature, pH [1]

(iii) sound/acoustic, infrared, pressure, motion, [1]

(iv) light sensor [1]

(b)

Any **six** from:

- infrared / motion / pressure (sensor) // sensor detects movement/pressure
- signals/data sent (continuously) to microprocessor
- converted from analogue to digital (using ADC)
- microprocessor compares value with those stored in memory
- if sensor value does not match the stored value(s) …
- … signal sent to switch on the light
- … signal sent to keep the light on
- … light remains on for a period of time (30 seconds)
- if sensor value matches the stored value(s) …
- … light will remain off
- … will turn off after period of time (30 seconds)
- works in a continues loop [6]

Q7:

(a)

Any **four** from:
- Shines light / (red) laser at barcode
- Light is called an illuminator
- Light is reflected back // White lines reflect light // Black lines reflect less light/absorbs light
- Sensors / photoelectric cells detect the light
- Different reflections / bars will give different binary values / digital values // pattern converted to digital values
- A microprocessor interprets the data

[4]

(b)

Any **three** from:
- barcode identifies a (unique) product
- barcode can be used to look up product (in a database)
- data about stock levels can be stored on a system
- stock can be automatically deducted from the system
- can check stock is below a certain level // check stock level
- automatic re-order // Alerts when stock is low
- automatically update new stock level
- to locate if an item of stock is available in another location   [3]

(c)

Any **four** from:
- (Infrared) rays are sent across screen (from the edges)
- Has sensors around edge // Sensors capture beams
- (Infrared) rays form a grid across the screen
- (Infrared) ray is broken (by a finger blocking a beam)
- **Calculation** is made (on where beam is broken) to locate the 'touch' // Co-ordinates are used to locate the touch

[4]