CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

2210 COMPUTER SCIENCE

2210/13 Paper 1, maximum raw mark 75

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.

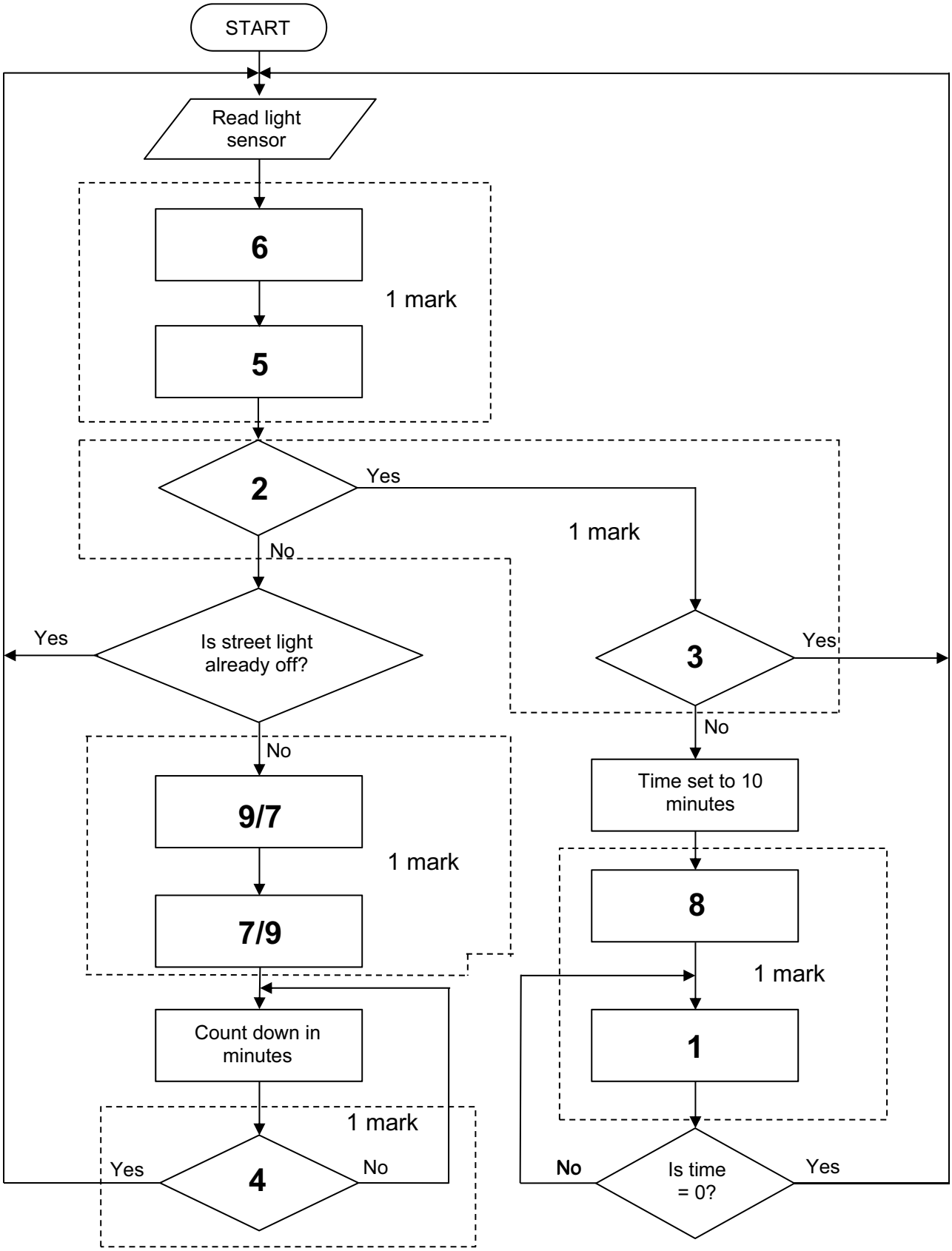
Cambridge is publishing the mark schemes for the October/November 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

1 (a) Temperature
– central heating / air con system
– greenhouse environment
– a chemical reaction / process

Magnetic field
– anti-lock brakes on a car
– detection of motor vehicles (e.g. at traffic lights)
– reading magnetic ink characters on cheques
– geophysical surveys

Motion
– automatic doors
– burglar alarm [3]

(b)



[5]

2 (a) Any **five** from:
– sensors send signals / data to microprocessor
– signal / data converted to digital (by an ADC)
– microprocessor compares temperature / carbon monoxide level / value with stored level / value
– if CO level > stored value, microprocessor sends signal…
– if temperature > stored value, microprocessor sends signal…
– …to light warning bulb on dashboard / sounds alarm [5]

(b) (i) 2 marks for all correct conditions, 1 mark for 2 correct conditions

CO (carbon monoxide) level too high
oil pressure too low
brake pads too thin [2]

(ii) 1 mark for each correct parity bit in position 1

1	**1**	**1**	**1**	**0**	**0**	**1**	**0**

0	**0**	**0**	**0**	**1**	**1**	**1**	**0**

[2]

(iii) 1 mark for correct parity bit + 1 mark for remainder of binary value

1	**0**	**1**	**0**	**0**	**0**	**1**	**0**

[2]

(iv) A 2 (allow follow through from part (iii)) [1]

3 (a) (i)

MAR

1	**0**	**0**	**0**	**0**	**0**	**0**	**1**

MDR

0	**1**	**0**	**1**	**0**	**0**	**0**	**1**

[2]

(ii)

MAR	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**0**
MDR	**0**	**1**	**1**	**1**	**1**	**0**	**0**	**1**

[2]

(iii)

Address	Contents
1000 0000	0110 1110
1000 0001	0101 0001
1000 0010	1000 1101
1000 0011	1000 1100
1000 1100	
1000 1101	
1000 1110	**0111 1001**
1000 1111	

[1]

(b) – CIR (Current Instruction Register)
– PC (Program Counter)
– Acc (Accumulator) [3]

(c) – Controls operation of memory, processor and input / output
– Instructions are interpreted
– Sends signals to other components telling them "what to do" [3]

4 **(a)** **(i)** Free software / open source software [1]

(ii) Any **three** from:
– Set of principles / laws that regulate the use of computers
– Covers intellectual property rights (e.g. copying of software)
– Privacy issues (e.g. accessing personal information)
– Impact of computers on society (relevant examples can be credited) [3]

(b) 1 mark for each CORRECT row

Statement	Firewall	Proxy server
Speeds up access of information from a web server by using a cache		✓
Filters all Internet traffic coming into and out from a user's computer, intranet or private network	✓	✓
Helps to prevent malware, including viruses, from entering a user's computer	✓	
Keeps a list of undesirable websites and IP addresses	✓	✓

[4]

(c) **one** mark for method + **one** mark for linked reason (maximum 6 marks)

– back up files…
– …on a regular basis / to another device / to the cloud

– set data to read only…
– …to prevent accidental editing

– save data on a regular basis…
– …to prevent loss / corruption of data in unexpected shutdown / failure

– use correct shut down / start up procedures…
– …to prevent damage to components / stored files

– use correct procedures before disconnecting portable storage device…
– …to prevent damage to device / data corruption

– keep storage devices in a safe place…
– …away from fire hazards [6]

5 **(a)** – Memory card / SSD / HDD / magnetic tape
– Suitable description of device given [2]

(b) 2 hours = 120 minutes
120 × 180 = 21 600
21 600 / 1024 (or 21 600 / 1000)
= **21.1 GB (or 21.6 GB)**

(1 mark for correct answer and 1 mark for correct calculation) [2]

6 Any **two** from:
– facial recognition software / biometric software used to scan face
– face image converted to digital format / data by the camera
– digital image formed from scanned photo / biometric data stored in passport
– key features of the face are checked / compared [2]

7

Application	Suitable output device
Production of one-off photographs of very good quality	**inkjet printer**
High volume colour printing of advertising flyers	**laser printer**
Production of an object, which is built up layer by layer; used in CAD applications	**3D printer**
Converting electrical signals into sound	**speaker/headphones**
Showing enlarged computer output on a wall or large screen	**Projector**

[5]

8 1 mark for each named application + 1 mark for each matching reason for choice

Input device	Application and reason
Light sensor	Automatic doors – detects a person when light beam broken and opens doors Street lighting – detects change in light and switches on / off the street lights Greenhouse – ensures correct lighting conditions for growth of plants
Keyboard	Word processor / spreadsheet / database – need to key in data manually (e.g. report writing) Control room interface – need to manually key in data (e.g. flow speed of liquid)
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 check-ins – barcodes on luggage to track whereabouts
Touch screen	Ticket / information kiosk – easy method for public to enter data – limited number of options Mobile phone / tablet – easy method to input data – use of icons for application selection Control room interface – faster / easier method to input data into system – fewer chances of error since number of choices limited

[8]

9 **(a)** 8 MB
100 [2]

(b) **(i)** Any **two** from:
– removes sounds human ear can't hear very well
– if two sounds played at same time, softer sound removed
– uses perceptual music shaping [2]

(ii) Lossy [1]

(iii) **One** from, for example:
– jpeg
– MP4
– zip
– gif [1]

10 symmetric encryption

encryption key

plain text

encryption algorithm

cypher text [5]