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CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 series

0420 COMPUTER STUDIES

0420/12 Paper 1, maximum raw mark 100

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.

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(1) (a) For **each** chosen security issue, 1 mark for description + 1 mark for method of prote

security issue	description of security issue	method of protection
hacking	gaining **illegal/unauthorized** access to a computer system	– use of firewalls – use of passwords
pharming	code installed on the hard drive of a user's computer or on actual web server; code redirects user to a bogus/fake website without user knowing	– use of filters to authenticate websites – user should be alert and look for pharming clues which indicate being directed to a bogus site
phishing	creator sends legitimate-looking (fake) email in the hope of gaining personal/financial information; fake email replicates a well known company e.g. a bank	– ISPs can filter/block out phishing emails – user should be wary of opening links in emails
spyware	software that gathers information by monitoring key presses on a user's keyboard or activity and relays the information back to person who sent the spyware	– use of dropdown boxes – user should be alert and look for clues when using their computer
viruses	Program or coding that replicates itself /corrupts the system/ alters or deletes data	– anti-virus (software) – do not use disks/software from unknown sources – do not open emails from unknown senders

[6]

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(2) (a) (i) – as first character(s) keyed in, rest of word predicted /word(s) suggested according to the letter(s) already entered

(ii) Any **two** from (items below are only examples):

– MP3 player
– Bluetooth
– wifi
– camera
– Internet surfing
– GPS [2]

(b) 1 mark for each part:

(i) – less expensive/cheaper than other telephone systems
– can use webcams to have visual as well as text/speech

(ii) – poor quality/drop out/echoes are very common problems
– need to have fast broadband connection to work effectively

(iii) – <u>microphone and speaker/headphones</u>
– headset [3]

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(3) (a) 10/ten

(b) CB, CC, CG, CL

< - 1 mark - > < - 1 mark - >

(–1 mark for each additional item) [2]

(c) (**leather** = "Y") AND (**silver** = "Y" OR **grey** = "Y")

< - 1 mark - > < - - - - - - - - - - 1 mark - - - - - - - - - >

or

(**silver** = "Y" OR **grey** = "Y") AND (**leather** = "Y")

< - - - - - - - 1 mark - - - - - - - > < - - - - 1 mark - - - - >

or

(**leather** = "Y") AND ((**silver** = "Y") OR (**grey** = "Y"))

< - 1 mark - > < - - - - - - - - - - 1 mark - - - - - - - - - >

or

((**silver** = "Y") OR (**grey** = "Y")) AND (**leather** = "Y")

< - - - - - - - 1 mark - - - - - - - > < - - - - 1 mark - - - - > [2]

(d) (**green** = "N") [1]

(e) Any **one** from:

– uses up less memory (NOT space)
– faster to key in data/saves time when keying in data
– **fewer** mistakes made when keying in data [1]

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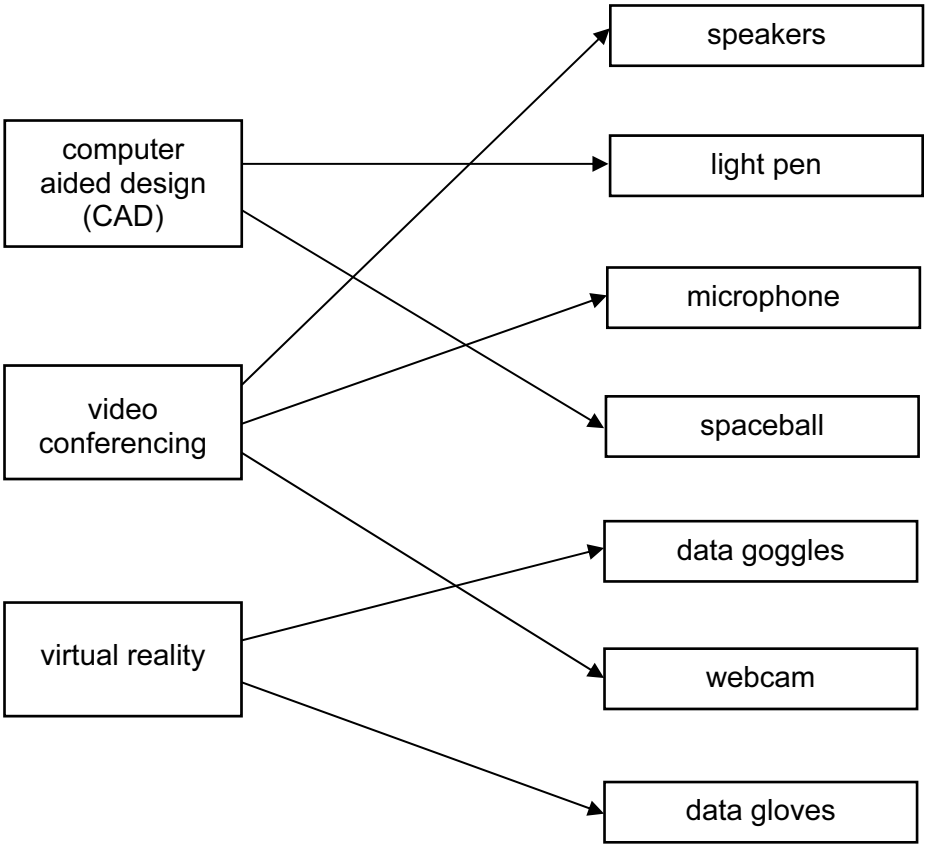
(4) (a) 1 mark for **each** application correctly linked to the appropriate hardware items.



[3]

(b) 1 mark for **each** additional item of hardware

CAD
- 3D (inkjet) printer
- large monitor/screen
- (graph) plotter
- graphics tablet

video conferencing
- **broadband** modem
- large monitor

virtual reality
- (data) helmet
- simulator headset
- sensor/data suit
- haptic/motion sensor

[3]

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(5)

count	total	a	b	c	d	x	y	temp	OUT-PUT
1	0	5	4	1	9	18	26	44	
	44							34	
								24	
								14	
								4	4
2	0	5	9	4	1	27	20	47	
	47							37	
								27	
								17	
								7	7
3									

< - - - -1 mark - - - >< - - - - - - - - - - 1 mark - - - - - - - - - - ><1 mark><1 mark><1 mark><1 mark>

[6]

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(6) **(a)** Any **one** from:

– circular argument/reference
– value in D2 not yet known
– empty cell D2 [1]

(b) = (A2 + C2 * B2) or = (A2 + B2 * C2) or

= (A2 + C2 * 9.81) or = (A2 + 9.81 * C2) [1]

(c) = (A7 + C7 * B7) or = (A7 + B7 * C7) or

= (A7 + C7 * 9.81) or = (A7 + 9.81 * C7) [1]

(d) = MAX(D2:D7) [1]

(e) = (A2 + B2 * 9.81) or = (A2 + 9.81 * B2) [1]

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(7) (a) (i) 1 mark for causes:

– repeated clicking of the mouse
– prolonged use of a keyboard/typing

1 mark for way of removing problem:

– take (regular) breaks
– use wrist supports
– use of ergonomic keyboards
– use of voice recognition software
– adjust chair to correct height [2]

(ii) Any **one** from:

– conduits/trunking for wiring
– wires/cables attached to walls
– wires under carpets/floors
– use WiFi connections [1]

(iii) One mark for risk: e.g.

– glare from/staring for a long period of time at a computer screen
– exposed wires
– inadequate desk support
– sitting too long in the same position
– spilling liquids on computer equipment/inadequate ventilation

One mark for **corresponding** description of risk (MUST match up)

– can cause headaches/eye strain/dry eye
– risk of electric shock/electrocution
– equipment falling and causing injury
– back/neck pain/injury/strain
– fire risk [2]

(b) Any **two** from:

– need for training
– possible redundancies/unemployment
– work patterns may change (e.g. working from home/remote working) [2]

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(8) 1 mark for error + 1 mark for suggested correction to error (max of **FOUR errors**)

description of possible error	suggested correction to error
line 20 lowest = 0	lowest = 100 (or even bigger value)
line 30 loop count is 1 to 100	count should be 1 to 1000 e.g. **for** count = 1 **to** 1000
line 50 number = highest	formula is reversed e.g. should be: highest = number
line 60 number = lowest	formula is reversed e.g. should be: lowest = number
line 70 count = count + 1 addition of count in a **for … to** loop	remove line 70 from coding

[8]

(9) Any **three** from:

– viruses transmitted with attachment
– possible phishing/spyware included with attachment
– attachment file too large/not enough space in mailbox
– she does not have the software to open the file
– attachment corrupted during transmission
– attachment was encrypted (and end user did not have encryption key)
– password needed to open file/attachment (password not known)
– virus checker/firewall detected virus and would not allow file/attachment to be opened [3]

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(10) (a) (i)

A	B	X	
0	*0*	**1**	1 mark
0	*1*	**1**	
1	*0*	**1**	1 mark
1	*1*	**0**	

[2]

(ii) NAND gate

(if truth table above is incorrect, allow follow through in part (ii)) [1]

(b)

A	B	C	X	
0	*0*	*0*	**0**	1 mark
0	*0*	*1*	**0**	
0	*1*	*0*	**0**	1 mark
0	*1*	*1*	**1**	
1	*0*	*0*	**1**	1 mark
1	*0*	*1*	**1**	
1	*1*	*0*	**0**	1 mark
1	*1*	*1*	**1**	

[4]

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(11) (a) 54

(b) – multiplied by 2
– value 27 is doubled (to become 54) [1]

(c) 108 [1]

(d) (i)

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

[1]

(ii) 184 [1]

(iii) – no more places left in register/binary number
– the left most 1 bit would disappear
– number would become 112 (0111 0000) instead of 368
– number would be greater than 255
– overflow [1]

(e) – divided by 2
– the number will be halved [1]

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(12) (a) Any **one** from:

– trackerball/touch pad
– touch screen [

(b) Each validation check MUST be different for each input:

goods reference number

– length check
– type/character check
– presence check
– check digit

today's date

– format check
– presence check
– length check
– range check (on each component)

telephone number

– type/character check
– presence check
– length check [3]

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(13) (a) **download speed** any **one** from:

– speed at which information/data is transferred FROM server/Internet
– speed at which information/data is transferred TO the user's computer

upload speed any **one** from:

– speed at which information/data is transferred FROM user's computer
– speed at which information/data is transferred TO the Internet/server [2]

(b) Any **two** from:

– can use Internet connection and telephone at the same time
– much faster data transfer speed
– always "on"
– charged for number of bytes/flat rate per month rather than actual time on line
– more bandwidth [2]

(c) Any **two** from:

– when transferring large files/attachments with emails
– when streaming music/video files/bit streaming
– when using VoIP/video conferencing
– software updates
– online transactions
– Using VLE (Virtual Learning Environment) [2]

(d) 128 Mbits/sec = 16 Mbytes/sec

Therefore, **FOUR (4) files** could be downloaded [1]

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(14) (a) Any **two** from:

– lightweight
– long battery life
– cool running processor
– touch pad
– internal webcam [2]

(b) Any **one** from:

– security (prevent illegal copying of data)
– storage of additional files/coding required to run software
– software only licensed to specific computers
– to allow the software to run on any computer [1]

(c) Any **two** from:

– multiple choice/yes-no answers
– easy to understand interface e.g. use of icons/drop down menus etc.
– output shown as % probabilities of fault [2]

(d) Any **three** from:

– knowledge base
– rule(s) base
– inference engine
– explanation system
– (expert system) shell [3]

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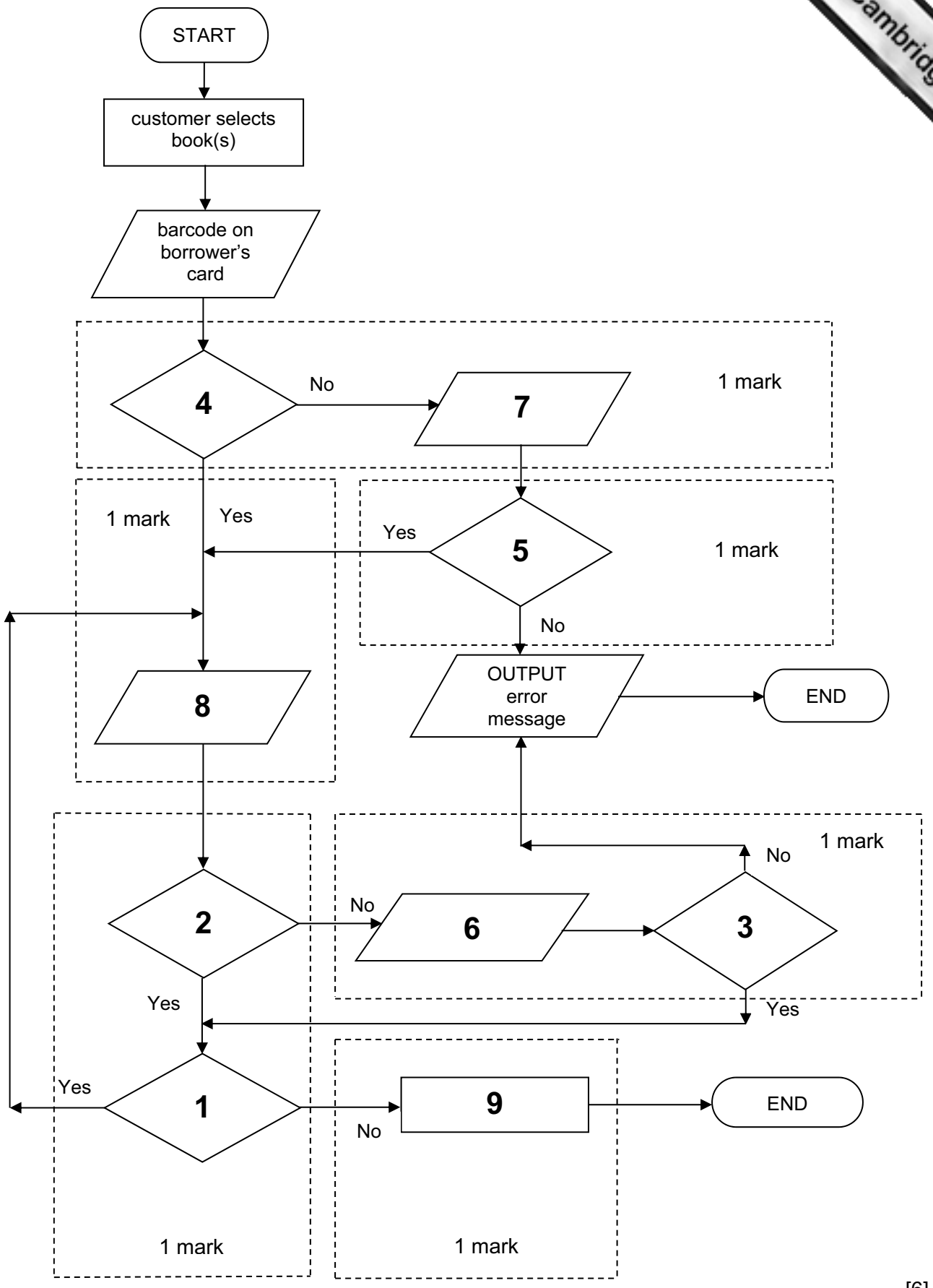

[6]

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(16) (a) marking points:

– correct loop 1 mark
– reading of BOTH sensors 1 mark
– check sensor1 + action taken 1 mark
– check sensor2 + action taken 1 mark
– read keyboard entry 1 mark

sample coding:

```
repeat
    read sensor1
    read sensor2                                    1 mark
        if sensor1 > 45 then print "warning"        1 mark
        if sensor2 < 0.19 then print "warning"      1 mark
    read key                                        1 mark
until key = ESCAPE                                  1 mark
                                                    [5]
```

(b) DAC

Any **two** points from:

– need to convert computer output to analogue values
– to allow it to operate motors, actuators, ……
– …… to open/close windows, switch heaters on/off etc.
– devices may not understand/respond to digital signals [2]

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