UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMPUTER STUDIES **0420/01**

Paper 1 **For Examination from 2011**

SPECIMEN MARK SCHEME

2 hours 30 minutes

MAXIMUM MARK: 100

1 **One** mark for each property and **one** mark for each reason:

consume little power ….
…. hence prolonging internal battery life
run cool ….
…. thus minimising problem of heat dissipation
no processor fans required ….
…. therefore prolonging internal battery life [4]

2 **(a)** Any **two** points from:

- sensors collect data from weather stations
- readings from weather stations sent to the weather centre on disk etc.
- readings from other sources (e.g. airline pilots) sent to weather centre
- weather balloons, satellites, etc. send information remotely [2]

(b) Any **two** points from:

- system compares known weather patterns/data ….
…. with new data received
- known weather patterns produced from previous data
- carries out a statistical probability calculation of most likely weather [2]

(c) Any **two** ways from:

- "weather map" superimposed map of country/area
- can show changes in weather patterns in time (e.g. movement of clouds)
- produces series of figures showing pressures, temperatures, etc.
- produces colour-keyed symbols to show temperature, rainfall, etc. [2]

3 **(a)** Any **two** points from:

- required values stored on embedded microprocessor in the oven
- when barcode read, stored values retrieved ….
…. and are compared to data on the microprocessor
- oven automatically sets timings, temperatures, etc. [2]

(b) Any **two** advantages from:

- can't get it wrong
- no need to set the oven manually (e.g. power settings)
- cooking conditions can be variable – therefore produce ideal cooking environment [2]

4 **(a)** Any **two** points from:

- use of global positioning satellites
- satellites transmit signals to Earth
- car system receives signals from (at least 3) satellites …
- … and calculates position of car
- combines satellite information with stored maps to allow directions [2]

(b) Any **one** point from:

- safer – no need to read maps
- allows driver to concentrate on driving
- no need to interpret maps [1]

(c) Any **two** reasons from:

- road changed – therefore no longer matches stored maps
- global positioning not sufficiently accurate
- (temporary) loss of signal [2]

5 **(a)** Any **two** difference from:

- (Internet) INTERnational NETwork
- (Intranet) INTernal Restricted Access NETwork
- Intranet only gives local information relevant to, e.g. a company
- can block access to sites outside the company network
- based on a local network, not necessary to have external modems
- information stored on local servers
- Internet can be accessed from anywhere
- Internet available to everyone; intranet requires password entry
- intranet is behind a firewall
- a computer network, based on Internet technology, that is designed to meet the internal needs for sharing information within a single organisation or company
- an intranet is a web site geared toward use specifically by a company's employees. It will often contain company or project-specific information that allows employees to coordinate more efficiently [2]

(b) Any **two** reasons from:

- safer since less chance of external hacking or viruses
- can prevent workers accessing unwanted sites
- can ensure information is specific to the company
- easier to send out “sensitive” messages to remain within company only [2]

6 **(a)** Any **two** advantages from:

- more secure since user needs both the card and the PIN to access
- secures online transactions since smart card read directly ….
  …. and this contains encryption algorithms etc. [2]

(b) Any **two** advantages from:

- passport cannot be copied – reduces fraud
- chip contains personal data which identifies passport owner
- induction loop allows passport to be read by "portal" readers [2]

7 Any **five** descriptions of systems life cycle stages:

- fact finding (e.g. by way of interviews etc.)
- feasibility study (e.g. cost benefits etc.)
- analysis stage (e.g. analyse company requirements etc.)
- design stage (e.g. determine hardware and software etc.)
- testing strategies (e.g. how to test validation routines etc.)
- user/technical documentation (e.g. technical doc contains algorithms etc.)
- implementation (e.g. immediate changeover etc.)
- evaluation (e.g. feedback on ease of use of new system etc.)
- maintenance (e.g. new hardware added to meet a new need etc.) [5]

8 **(a)** larger memory capacities in smaller space [1]

(b) Any **two** ways from:

- send an email/message from phone to computer
- take out the memory card and connect to computer
- connect phone via USB port to computer [2]

(c) Any **two** advantages from:

- on the move, can download information on maps etc.
- can readily download bus timetables etc. when away from home
- can access websites while at, e.g., the supermarket doing shopping [2]

9 **One** mark for each correct error identified

line 20 – **smallest** should be set at a high value such as **smallest = 100000**
line 30 – loop does 101 iterations; should be **for** x=1 **to** 100
line 70 – count not required inside **for** loop; x = x + 1 would corrupt the loop [6]

10 **One** mark for correct output, **two** marks for other two columns being correct trace tables:

(i)

X	N	T	A	B	C	Output
			0	0	0	
1	5	30	1			
2		20	2			
3		-20		1		
4		10	3			
5		-30		2		
6						3, 2, 0

← - - - - - - - - 1 mark - - - - - - →← - - - - - - - - 1 mark - - - - - - →← 1 mk → [3]

(ii)

X	N	T	A	B	C	Output
			0	0	0	
1	8	0			1	
2		0			2	
3		-10		1		
4		5	1			
5		20	2			
6		0			3	
7		0			4	
8		0			5	
9						2, 1, 5

← - - - - - - - - 1 mark - - - - - - →← - - - - - - - - 1 mark - - - - - - →← 1 mk → [3]

11 **One** mark per two rows:

Truth table:

A	B	C	X
1	1	1	1
1	1	0	1
1	0	1	0
1	0	0	0
0	1	1	0
0	1	0	1
0	0	1	0
0	0	0	0

[4]

12 Statement:

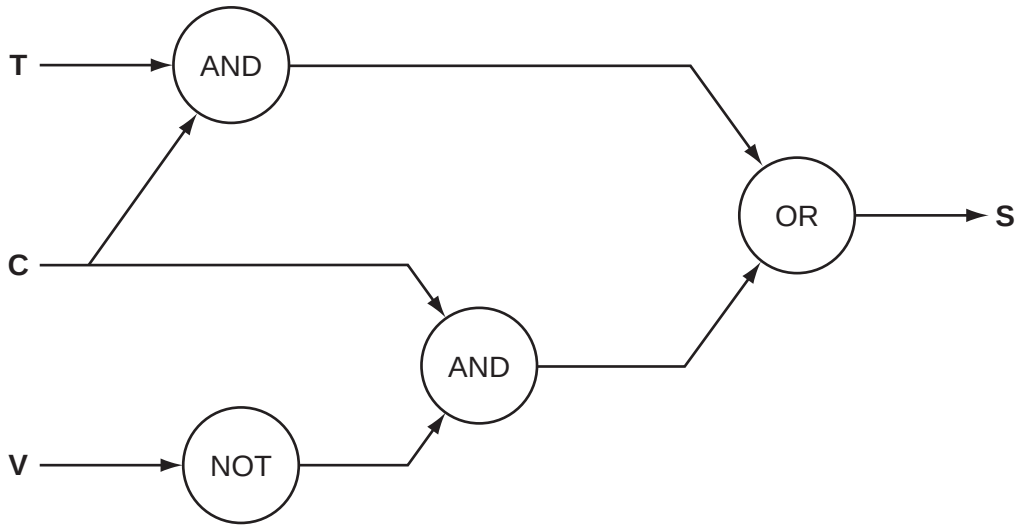
Award marks as shown:

S = 1 if [T = 1 **AND** C = 1] **OR** [V = **NOT** 1 **AND** C = 1]

←- - - - 1 mark - - - - → ←- - - - - 1 mark - - - - - → [2]

Logic network:

Award **one** mark per correct gate:



[4]

Truth table:

Award **one** mark for each row showing correct 1-value in column S:

T	C	V	S
1	1	1	1
1	1	0	1
1	0	1	0
1	0	0	0
0	1	1	0
0	1	0	1
0	0	1	0
0	0	0	0

[3]

13 (a) **One** mark per device, **one** mark for type of memory and **one** mark for reason;

devices such as:	USB flash memories MP3/4 players Cameras Mobile phones
memories such as:	Solid state Miniature hard drives
reasons such as:	Hard drives are removable Solid state – no need for battery back up [6]

(b) Any **two** points from:

- use of a read head and write head working independently
- use of data buffers
- reference to special software to allow dual access [2]

(c) Any **two** points from:

- different file formats used by the two systems
- protection built into the music files
- file corruption during download [2]

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

- safer to work force since less travelling involved
- much cheaper than paying for transport/accommodation
- changes in communications policies/philosophy
- faster response to issues where many people needed
- less stressed work force (thus more efficient)
- don't lose staff for several days whilst attending meetings [2]

(b) Any **two** effects from:

- less environmental impact (less air travel)
- less travelling (so less stress)/less time away from home
- less social mixing with other personnel from other offices
- loss of "incentive" of foreign travel [2]

15 (a) use of satellite technology [1]

(b) Any **one** from:

- can look for a landmark and then find street/road names
- can see what roads really look like which helps when driving [1]

(c) Any **one** from:

- can type in 2 post/zip codes and get journey map
- can see route highlighted on screen maps [1]

16 (a) **One** mark per reason

if two digits transposed e.g. **1 5** 2 8 instead of **5 1** 2 8

if one digit is incorrect e.g. 5 **4** 2 8 instead of 5 **1** 2 8 [2]

(b) (i) 8 7 6 5 4 3 2 1 } 1 mark
8 1 3 9 1 2 0 7 }

sum = 64 + 7 + 18 + 45 +4 + 6 + 7 = 151 } 1 mark

divide by 11 gives 13 remainder 8 } 1 mark

thus number is **not valid** } 1 mark

(ii) 8 7 6 5 4 3 2 1 } 1 mark
5 5 0 3 1 6 1 7 }

sum = 40 + 35 + 15 + 4 + 18 + 2 + 7 = 121 } 1 mark

divide by 11 gives 11 remainder 0 } 1 mark

thus number is **valid** } 1 mark [6]

17 **(a)** check digit [1]

(b) Any **two** points from:

date/time of flight
flight number
weight (in kg) of luggage
destination airport
intermediate airport(s)
passenger name
passenger address
departure terminal/airport
passport number [2]

(c) Any **one** advantage from:

- can track whereabouts of luggage
- in case luggage is lost, can locate its history
- easier to ensure correct transfer of luggage if intermediate airport used [1]

(d) Any **one** from:

supermarkets
smart ovens [1]

18 **One** mark per sensor

automatic doors – infra red sensors
central heating – temperature sensors [2]

19 Award marks as shown up to the maximum of 6 marks

```
best = 0
worst = 100                                                    } 1 mark
total = sum = 0
for x = 1 to 3650                                              } 1 mark
    input xchangerate                                          } 1 mark
        if xchangerate > best then best = xchangerate          } 1 mark
        if xchangerate < worst then worst = xchangerate        } 1 mark
        if xchangerate > 2 then total = total + 1              } 1 mark
            sum = sum + xchangerate
next x
avge = sum/3650                                                } 1 mark
output best, worst, total, avge                                } 1 mark
```

<u>marking points:</u>

correct initialisation	1 mark	
correct loop and loop control	1 mark	
correct input (inside loop)	1 mark	
check on best and worst exchange rates	2 marks	
counting number of occasions when rate exceeded 2.0	1 mark	
finding the average value (sum inside loop and calc)	1 mark	
correct outputs (all outputs AND outside loop)	1 mark	[6]