UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

COMPUTER STUDIES **0420/01**

Paper 1 **For Examination from 2011**
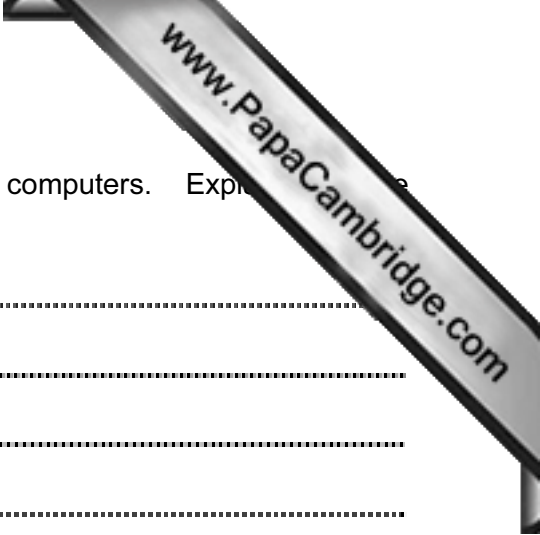
SPECIMEN PAPER

2 hours 30 minutes

READ THESE INSTRUCTIONS FIRST

Attempt **all** questions using the spaces provided.

Calculators may be used.

Brand names of software will not be regarded as acceptable answers.

This document consists of **16** printed pages and **2** blank pages.

1   State **two** desirable properties of processors found in laptop computers.   Expl............. e
selected property is desirable.

Property 1   ....

....

Reason   ....

....

....

Property 2   ....

....

Reason   ....

....

.... [4]
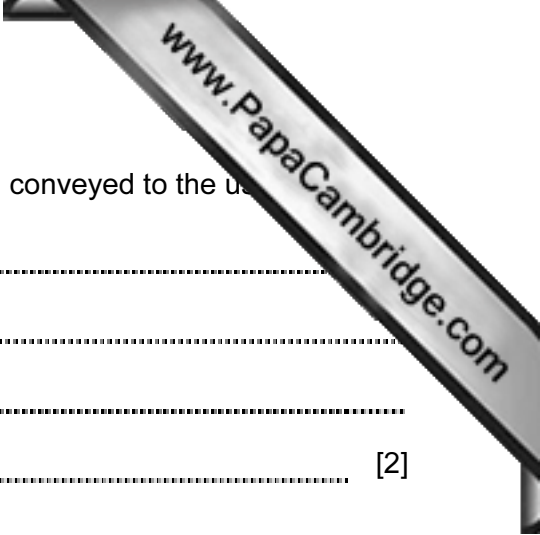

2   Weather forecasting using computer models has made predicting weather more accurate.

(a) Describe how data is gathered for the computer model.

....

....

....

.... [2]

(b) How does the computer model make its prediction based on the new weather data input?

....

....

....

.... [2]

(c) Describe **two** ways the predicted weather for a week could be conveyed to the u

1 ....

....

2 ....

.... [2]

3 Some items of food now have additional bar codes which convey information about how to cook the food. Special ovens are needed to take advantage of this additional information. If the bar code is held close to a reader on the front of the oven, the oven will automatically set cooking times and temperature settings to ensure the perfect meal.

(a) How does the oven ensure that the food is correctly cooked?

....

....

....

.... [2]

(b) Give **two** advantages to the user of this new technology.

1 ....

....

2 ....

.... [2]

4 Vehicles are now fitted with satellite navigation systems (GPS) to help them get direc

(a) How does the system know the exact position of the vehicle?

....

....

....

.... [2]

(b) The directions are often given verbally. Give **one** advantage of doing this.

....

.... [1]

(c) The satellite navigation systems are known to sometimes give incorrect directions. Give **two** reasons why this might happen.
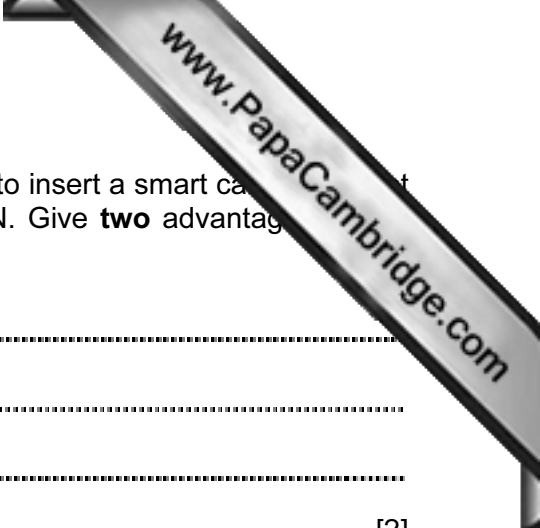
1 ....

....

2 ....

.... [2]

5 **(a)** Give **two** differences between an intranet and the Internet.

1 ....

....

2 ....

.... [2]

(b) Give **two** reasons why companies allow intranet access rather than Internet access to their employees.

1 ....

....

2 ....

.... [2]

6 (a) To access the Internet, a computer system requires the user to insert a smart ca̵ on the side of a keyboard. They then need to type in a PIN. Give **two** advantag̵ system.

1 ....

....

2 ....

.... [2]

(b) Many passports and security cards now contain an induction loop and microchip which uniquely identifies the item and the user. Give **two** security advantages of using such a system.

1 ....

....

2 ....

.... [2]

7 Briefly describe **five** of the stages in the systems life cycle of a project.

1 ....

....

2 ....

....

3 ....

....

4 ....

....

5 ....

.... [5]
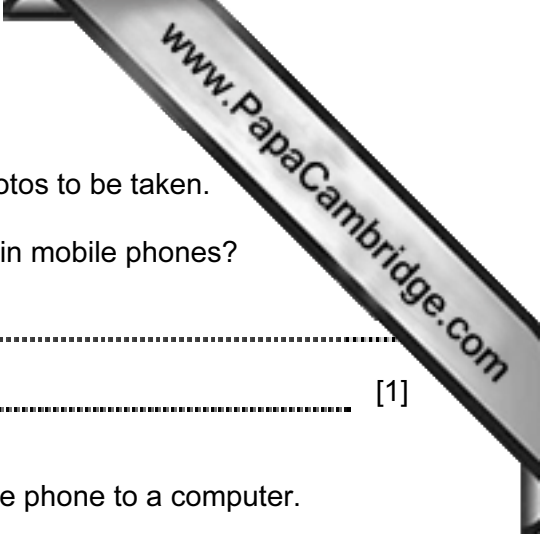
8   Many mobile phones offer cameras which allow still and movie photos to be taken.

(a) What recent technology has enabled this facility to be offered in mobile phones?

....

.... [1]

(b) Describe **two** ways to download the photo files from the mobile phone to a computer.

1 ....

....

2 ....

.... [2]

(c) Access to the Internet is also offered to mobile phone users. Give **two** advantages of this technology.

1 ....

....

2 ....

.... [2]

9   The following algorithm inputs 100 numbers and outputs which number is the smalle~~~~~
    number is the largest.

```
10   largest = 0
20   smallest = 0
30   for x = 0 to 100
40           input number
50           if number > largest then largest = number
60           if number < smallest then smallest = number
70           x = x + 1
80   next x
90   print largest, smallest
```

There are three errors in this algorithm. Locate these errors and suggest what changes should
be made to the algorithm.

Error 1 ....

....

Change 1 ....

....

....

Error 2 ....

....

Change 2 ....

....

....

Error 3 ....

....

Change 3 ....

....

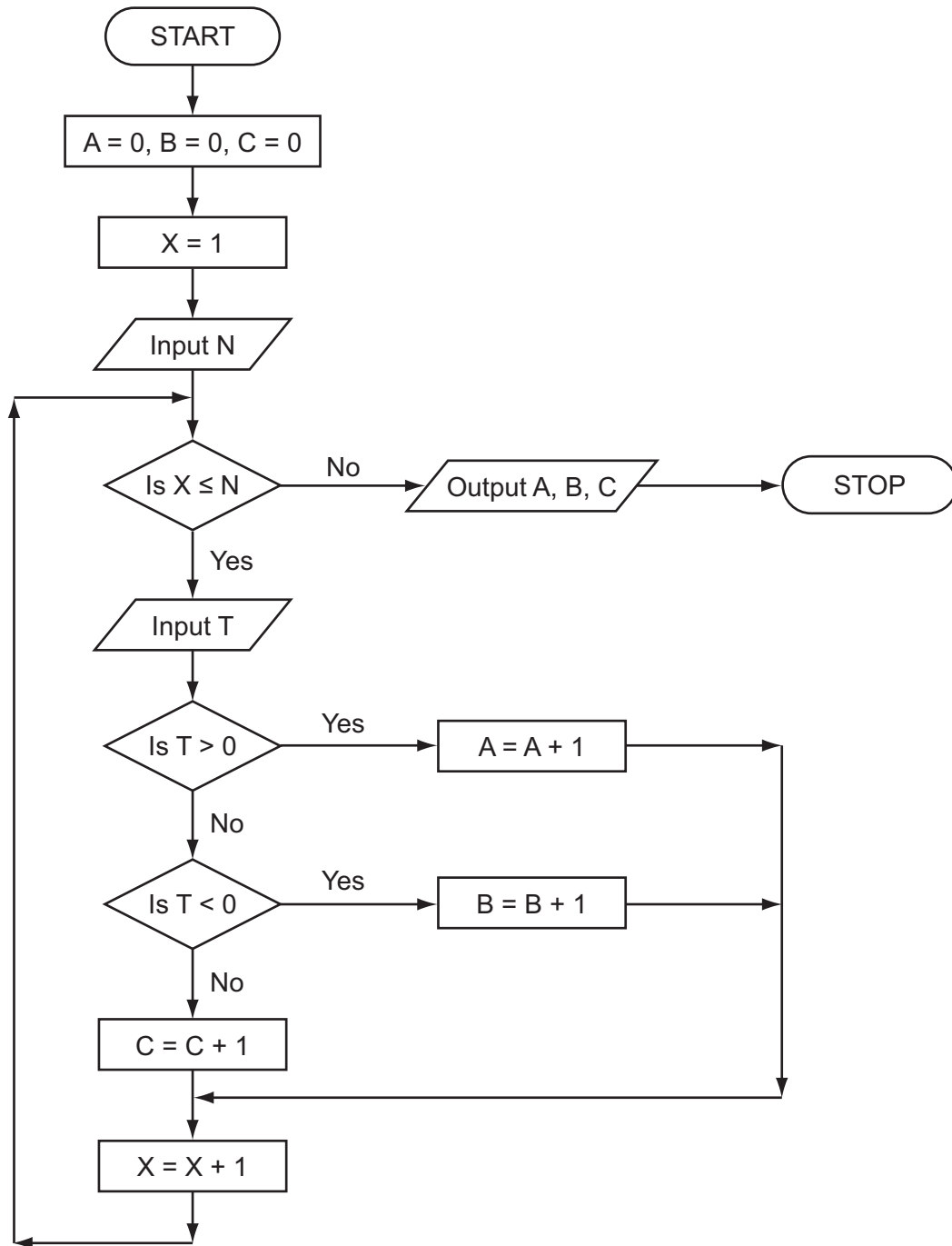... [6]

10 Read the following flowchart carefully.

Draw the trace tables for the following sets of test data

(i)   5, 30, 20, −20, 10, −30
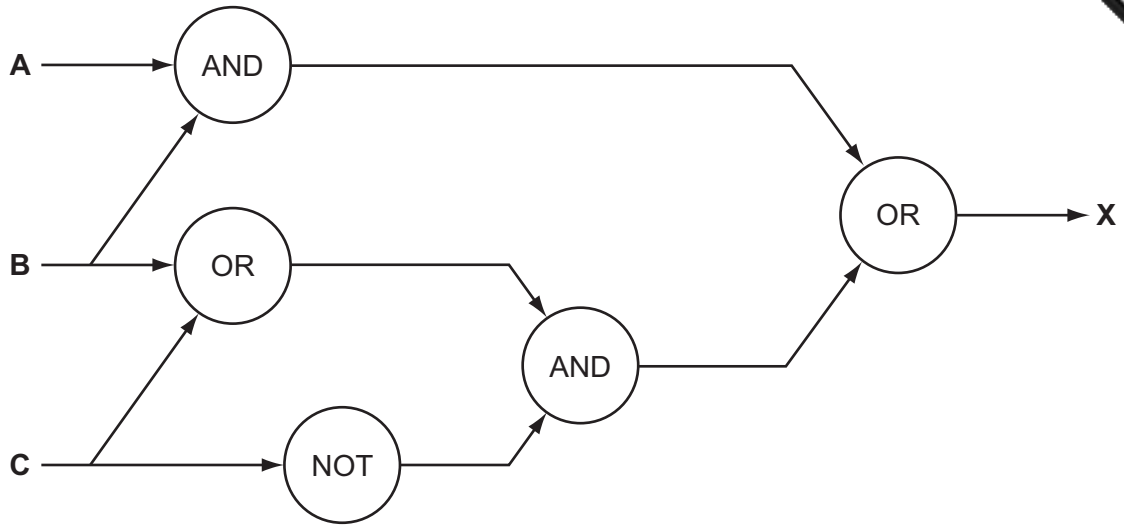
(ii) 8, 0, 0, −10, 5, 20, 0, 0, 0

(i)

X	N	T	A	B	C	Output

(ii)

X	N	T	A	B	C	Output

[6]

11 Draw the truth table for the following logic network:

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

[4]

12 Draw a logic network and truth table for the following logic problem:

"A sprinkler (S) is **ON** if
    <u>either</u> temperature alarm (T) is **ON** <u>and</u> cooler alarm (C) is **ON**
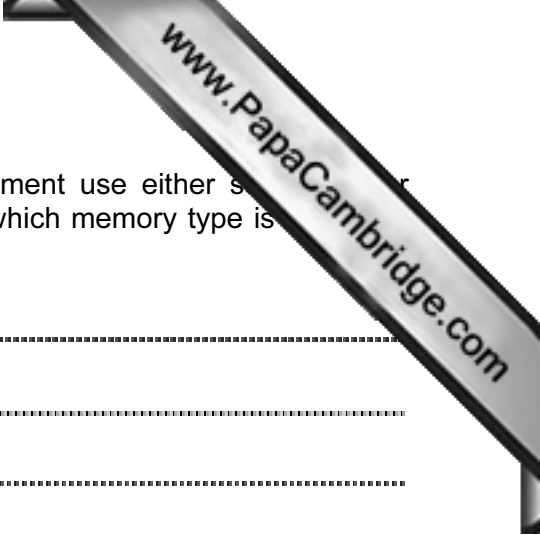   <u>or</u> vent alarm (V) is **OFF** <u>and</u> cooler alarm (C) is **ON**"

Working ....

....

....

....

Logic network:

Truth table:

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

[9]

13 (a) Many of the portable memory devices available at the moment use either s_____ or miniature hard disk drives. Choose **two** devices and state which memory type is _____ why it is used.

Device 1 ....

Type of memory ....

....

Reason for choice ....

....

....

....

Device 2 ....

Type of memory ....

....

Reason for choice ....

....

....

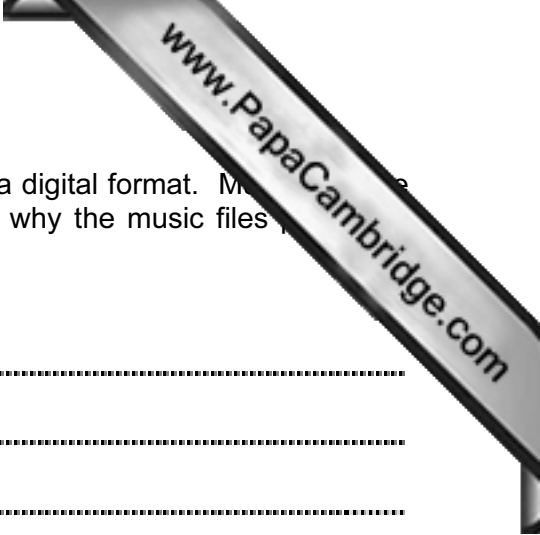... [6]

(b) New recording systems use hard drives to store movie files. How is it possible to record on the hard drive at the same time as reading from it?

....

....

....

.... [2]

(c) Two rival companies offer devices which store music files in a digital format. M............e down loaded from the Internet. Give **two** possible reasons why the music files ....correctly on one machine but not the other.

1 ....

....

2 ....

.... [2]

14 The use of video conferencing has increased considerably in recent years.

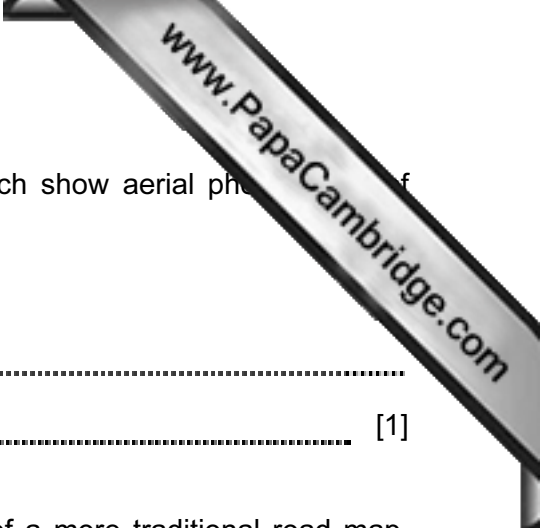**(a)** Give two effects on companies in adopting video conferencing.

1 ....

....

2 ....

.... [2]

(b) Give **two** social effects of adopting video conferencing.

1 ....

....

2 ....

.... [2]

15 Using the Internet it is possible to home in on live images which show aerial ph_____ f buildings anywhere on the Earth.

(a) How are the photographs of buildings generated?

....

.... [1]

(b) It is possible to have the aerial photograph placed on top of a more traditional road map. Give an advantage to the user of having this facility.

....

.... [1]

(c) Give **one** additional facility of having online maps available on the Internet.

....

.... [1]

16 A system uses 8 digit numbers with an additional eighth digit used as a check digit.

(a) Give **two** types of error which can be detected using a check digit when transmitting d

1 ....

....

2 ....

.... [2]

(b) Each of the eight digits in the number has a *digit position*.

e.g.   8 7 6 5 4 3 2 1   ←   digit position
        3 0 5 5 1 6 2 5   ←   digits (digit in position 1 is the check digit)

The validity of the check digit is found using the following calculation:
- multiply each digit by its digit position
- add together the results of the multiplications
- divide the sum by 11
- if the remainder is ZERO then the number is valid

For example, in the above number we have a sum of 110. Dividing by 11 gives a remainder of 0. Thus the number is valid. For each of the following 8 digit numbers, indicate whether they are valid or not. Show all working.

(i) 8 1 3 9 1 2 0 7

Working: ....

....

....

....

....

Valid number? ....

(ii) 5 5 0 3 1 6 1 7

Working: ....

....

....

....

....

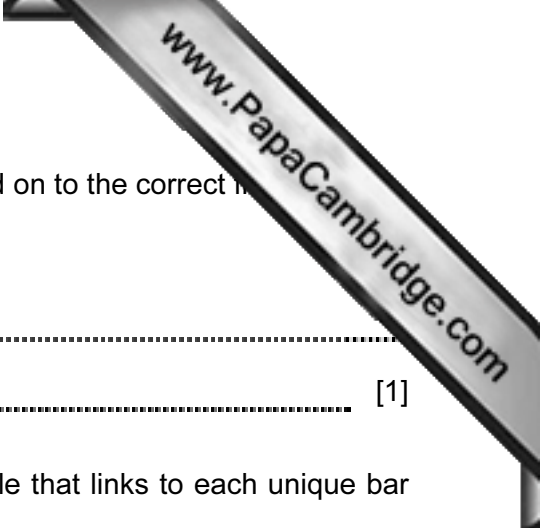Valid number? .... [6]

17 Airports put a unique bar code on all luggage to ensure it is loaded on to the correct ~~~~

(a) What validation check is made on a bar code number?

....

.... [1]

(b) Give **two** pieces of information that could be stored on the file that links to each unique bar code.

1 ....

....

2 ....

.... [2]

(c) Give **one** advantage of using bar codes in this application.

....

.... [1]

(d) Give an example of another application for bar codes.

....

.... [1]

18 Many systems are now controlled by microprocessors and sensors.
Name **two different** sensors which could be used to control the following systems:

Automatic doors   ....

....

Central heating   ....

.... [2]

19 The exchange rate between the US Dollar (US$) and the Brazilian Real (R$) change~~s~~

Write an algorithm, using pseudocode or otherwise, which inputs the exchange rate for ev~~ery day~~ over a 10 year period (assume that each year = 365 days) and then outputs the following:

- The average (mean) exchange rate
- The best (highest) exchange rate
- The worst (lowest) exchange rate
- The number of occasions when the exchange rate was above 2.0

[6]

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