CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

COMPUTING **9691/13**

Paper 1 **May/June 2016**

1 hour 30 minutes

Candidates answer on the Question Paper.

No additional materials are required.

No calculators allowed.

[Turn over

1   State **two** differences between RAM and ROM.

   1 ....

   ....

   2 ....

   ....
                                                                                                                          [2]
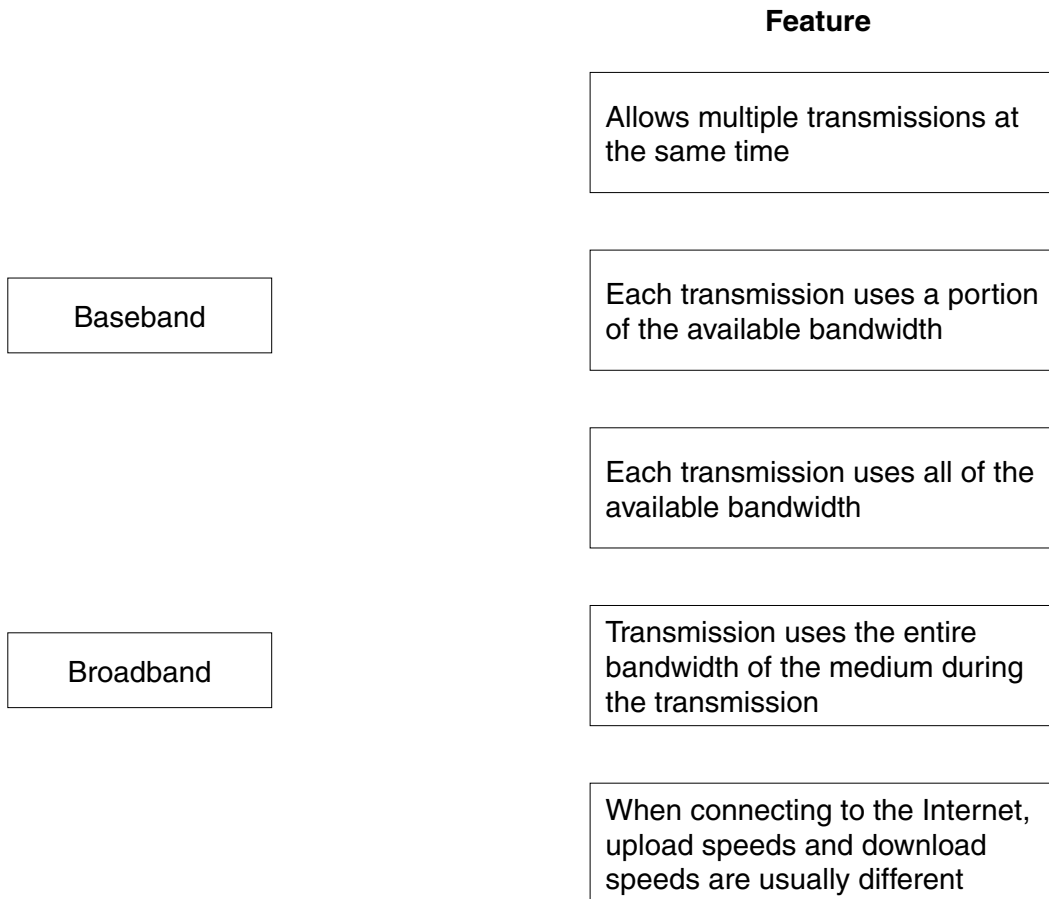
2   (a)   The diagram below shows the terms baseband and broadband.

   Five features about these terms are also shown.

   Draw one or more lines from each term to its correct feature(s).

                                                                     Feature

                                                         ┌────────────────────────────────┐
                                                         │ Allows multiple transmissions at │
                                                         │ the same time   │
                                                         └────────────────────────────────┘

                                                         ┌────────────────────────────────┐
                    ┌──────────────────┐   │ Each transmission uses a portion │
                    │   Baseband   │   │ of the available bandwidth   │
                    └──────────────────┘   └────────────────────────────────┘

                                                         ┌────────────────────────────────┐
                                                         │ Each transmission uses all of the │
                                                         │ available bandwidth   │
                                                         └────────────────────────────────┘

                                                         ┌────────────────────────────────┐
                    ┌──────────────────┐   │ Transmission uses the entire   │
                    │   Broadband   │   │ bandwidth of the medium during   │
                    └──────────────────┘   │ the transmission   │
                                                         └────────────────────────────────┘

                                                         ┌────────────────────────────────┐
                                                         │ When connecting to the Internet, │
                                                         │ upload speeds and download   │
                                                         │ speeds are usually different   │
                                                         └────────────────────────────────┘
                                                                                                                          [5]

(b) (i) State **two** advantages of using broadband rather than using a dial-up connection when accessing the Internet.

1 ....

....

....

2 ....

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[2]

(ii) Give **two** applications where it is essential to have a high-speed broadband connection.

1 ....

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2 ....

....

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[2]

(c) Computers can send data across networks using packet or circuit switching.

(i) Explain the meaning of the term circuit switching.

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....[2]

(ii) When using packet switching each packet has a header. The header includes the destination address.

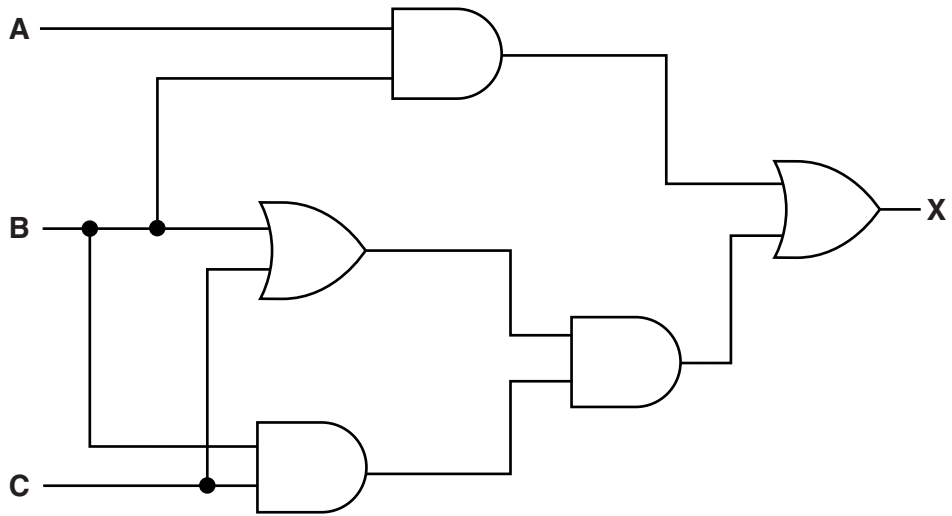Name **three** other data items found in the header.

1 ....

2 ....

3 ....
[3]

3 Six descriptions and nine computing terms are shown below.

Draw a line to link each description to the appropriate computing term.

Description	**Computing term**

Generate a value from a string of text using a mathematical function

Archiving

Back up

Copy files for long term storage; the files are no longer in active use and a computer often stores them in compressed form

Buffer

A computer often reads a file of records from the beginning, in sequence, until a required record is found

Disk formatting

Disk operating system

Prepare storage media (such as hard disk) for initial use

File compression

Physical memory that temporarily stores data waiting for transfer

Hashing

Interrupt

A signal that hardware or software sends to the processor requesting immediate attention

Serial access

[6]

4 (a) Complete the truth table for the following logic circuit.

INPUT			Workspace	OUTPUT
A	B	C		X
0	0	0		0
0	0	1		0
0	1	0		0
0	1	1		1
1	0	0		0
1	0	1		0
1	1	0		1
1	1	1		1

[4]

(b) Write a logic statement for the logic circuit in **part (a)**.

X = (A AND B) OR ((B OR C) AND (B AND C))

....

....

....

....[3]

5 A teacher uses spreadsheet software to analyse the test results of her students. A section of the spreadsheet is shown below:

	A	B	C	D	E	F
1	student name	maths (%)	computing (%)	geography (%)	average percentage (all subjects)	distinction, pass or fail
2	Tomas	41	37	42	40	
3	Sean	58	62	30	50	
4	Toni	60	55	38	51	
5	Irina	70	81	80	77	
6	Arslan	31	62	27	40	
7	Ciprian	48	59	52	53	
8						
9						
10						

(a) The teacher will write the formula `MAX(B2:B7)` into cell B10.

Describe what the value calculated in B10 will represent.

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....[2]

(b) Students are to be awarded an overall grade based on their average percentage (in column E). The grades are calculated in column F.

Grades are awarded as follows:

- 70% or more is a Distinction
- 50% to 69% is a Pass
- less than 50% is a Fail

Explain how the teacher can calculate these grades.

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....

....[2]

(c) There are other features of spreadsheet software that the teacher could use in her analysis of the students' performance. Name and describe **two** of these.

1 ....

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....

....

2 ....

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....

[4]

(d) Spreadsheet software is an example of off-the-shelf software.

Give **two** advantages of off-the-shelf software compared to custom-written software.

1 ....

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2 ....

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....

[2]

6 (a) A bus network is one type of network topology.

Name **two** other network topologies. Give **one** benefit and **one** drawback of each topology compared to a bus network.

1 ....

Benefit ....

....

....

Drawback ....

....

....

2 ....

Benefit ....

....

....

Drawback ....

....

....

[6]

(b) Local Area Networks (LANs) and Wide Area Networks (WANs) need specialist hardware to operate correctly.

Name **three** hardware items that either network needs. Describe their function in each case.

1 ....

Function ....

....

....

2 ....

Function ....

....

....

3 ....

Function ....

....

....

[6]

7 A parcel delivery company collects and delivers parcels. Customers telephone to arrange for collection of a parcel. Delivery is then scheduled for the next day. The telephone operator, delivery drivers and manager all work in the same building.

The company uses a very old computer system to process collections and deliveries. This system is unable to deal with the increasing number of customers.

A systems analyst has been employed to investigate the modernisation of this current computer system.

(a) One part of the investigation is fact finding.

Explain how the systems analyst can use the following fact finding methods to investigate this collection and delivery service.

Observation

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Examine documentation

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Interviews

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Questionnaires

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[8]

(b) The existing user interface uses a form. The telephone operator keys in all the data.

```
┌─────────────────────────────────────────────────────────────┐
│                   ROCKICT Parcel System                       │
│                                                               │
│  Type in the collection point      > .........................│
│  Type in the destination           > .........................│
│  Type in the pick-up date          > .......... / .......... / ...............│
│  Type in earliest pick-up time     > .................. : ....................│
│  Type in latest pick-up time       > .................. : ....................│
│  Express delivery?                 > .........................│
│  Insurance?                        > .........................│
│                                                               │
├───────────────────────────────────────────────────────────────┤
│             Press <ENTER> to go to the next screen            │
│                                                               │
└───────────────────────────────────────────────────────────────┘
```

(i) Explain why this existing interface is not efficient.

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....[2]

(ii) Describe **three** ways to improve the existing user interface.

1 ....

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2 ....

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3 ....

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[3]

8 A process is devised for encoding letters using 20 bits. The process starts by giving each letter of the alphabet a value: A = 1, B = 2, C = 3, ..., Z = 26.

The value for each letter is represented using 16 bits. For example, the letter 'V' (22nd letter) is represented by:

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

A further 4 bits store an encoding key. This key is the number of places by which the encoding process moves the 16-bit pattern to the left.

For example, the encoding key:

0	1	1	1

means that the encoding process moves each bit in the 16-bit pattern 7 places to the left. The 16-bit pattern then becomes:

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

The 4-bit pattern and the 16-bit pattern together form the encoded letter 'V':

0	1	1	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0

(a) 'Y' is the 25th letter of the alphabet.

  (i) Show how 16 bits initially store the value for this letter:

[1]

  (ii) The encoding process uses the following 4-bit encoding key:

0	1	0	1

  Show how the letter 'Y' is now transformed:

[1]

(b) Find the letter of the alphabet that has been encoded here.

Show your working.

1	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0

....

....

....

....[2]

(c) The encoding process uses the following 4-bit encoding key:

1	1	1	1

Describe the problem that this encoding key will cause.

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....[2]

 [Turn over

9 A student wrote the following five answers on a computing exam paper.

Give a reason why each answer is incorrect.

(a) "The binary number 1 0 1 1 0 0 0 1 has odd parity since the number ends in a 1 and is therefore not an even number."

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....[1]

(b) "In a computer-controlled heating system, sensors send signals to the heaters to switch on or off."

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....[1]

(c) "The user guide supplied with software contains a program listing and a systems flowchart."

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....[1]

(d) "Data structures known as stacks use FIFO to insert and remove data."

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....[1]

(e) "A command line interface (CLI) uses icons to represent applications that are launched by a click of the mouse button."

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....[1]

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