

CANDIDATE
NAME

CENTRE
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COMPUTING

Paper 1

9691/13

May/June 2015

1 hour 30 minutes

Candidates answer on the Question Paper.

No additional materials are required.

No calculators allowed.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

No marks will be awarded for using brand names of software packages or hardware.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **15** printed pages and **1** blank page.

1 There are currently three types of secondary storage medium:

- magnetic
- optical
- solid state

(a) Give **one** example of each type of storage medium. Describe how data are stored on each of these types.

(i) Magnetic

Example

Description

.....

.....

[2]

(ii) Optical

Example

Description

.....

.....

[2]

(iii) Solid state

Example

Description

.....

.....

[2]

(b) Give **two** advantages of solid state media when compared to magnetic media.

1

.....

2

.....

[2]

2 Seven questions and eight numerical answers are shown below.

Draw a line to link each question to the appropriate numerical answer.

Question

Answer

The following binary pattern
1010011000111101 is stored in X bytes.
What is the value of X?

0

A stack contains the
values shown on the right.

$x \leftarrow \text{POP}$

What is the value of x?

6
8
10

1

Odd parity is used as an error check when
sending data. If X represents the parity bit,
what is the value of X in the byte below?

X 1 1 0 0 0 1 0

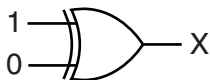
2

What denary value, X, is represented by the
binary number below?

0 0 0 0 1 1 0 0

4

What is the value of X in the following logic
gate?



8

An array, Number, contains;

4 8 2 6
4 6 4 8

$x \leftarrow \text{Number}[2, 4]$

What is x?

10

If $2^X = 1024$, what is the value of X?

12

[7]

- 3 A company designs and sells car parts. The company has three departments which have the following tasks to perform:

Department	Task
Design	design and test new car parts
Finance	produce hard copy reports on production costs, sales and profits
Marketing and Sales	present information to prospective customers

All tasks will use specialist software, a monitor, a keyboard and a mouse.

(a) Design and test new car parts

- (i) Describe **two** features of CAD software which make it suitable for this task.

Feature 1

.....

.....

Feature 2

.....

.....

[2]

- (ii) Name **one** other device suitable for this task.
Justify your choice.

Device

Justification

.....

.....

[2]

(b) Produce hard copy reports on production costs, sales and profits

(i) Describe **two** features of spreadsheet software which make it suitable for this task.

Feature 1

.....

.....

Feature 2

.....

.....

[2]

(ii) Name **one** other device suitable for this task.
Justify your choice.

Device

Justification

.....

.....

[2]

(c) Present information to prospective customers

(i) Describe **two** features of presentation software which make it suitable for this task.

Feature 1

.....

.....

Feature 2

.....

.....

[2]

(ii) Name **one** other device suitable for this task.
Justify your choice.

Device

Justification

.....

.....

[2]

- 4 A safety monitoring system uses three inputs S, T and G. These inputs are used in a logic circuit which produces an output value, X.

The description of each input is shown in the table.

Parameter	Description	Binary value	Conditions
S	sound level	1	sound level \geq 90 dB
		0	sound level $<$ 90 dB
T	temperature	1	temperature \geq 35°C
		0	temperature $<$ 35°C
G	oxygen level	1	oxygen level \geq 75%
		0	oxygen level $<$ 75%

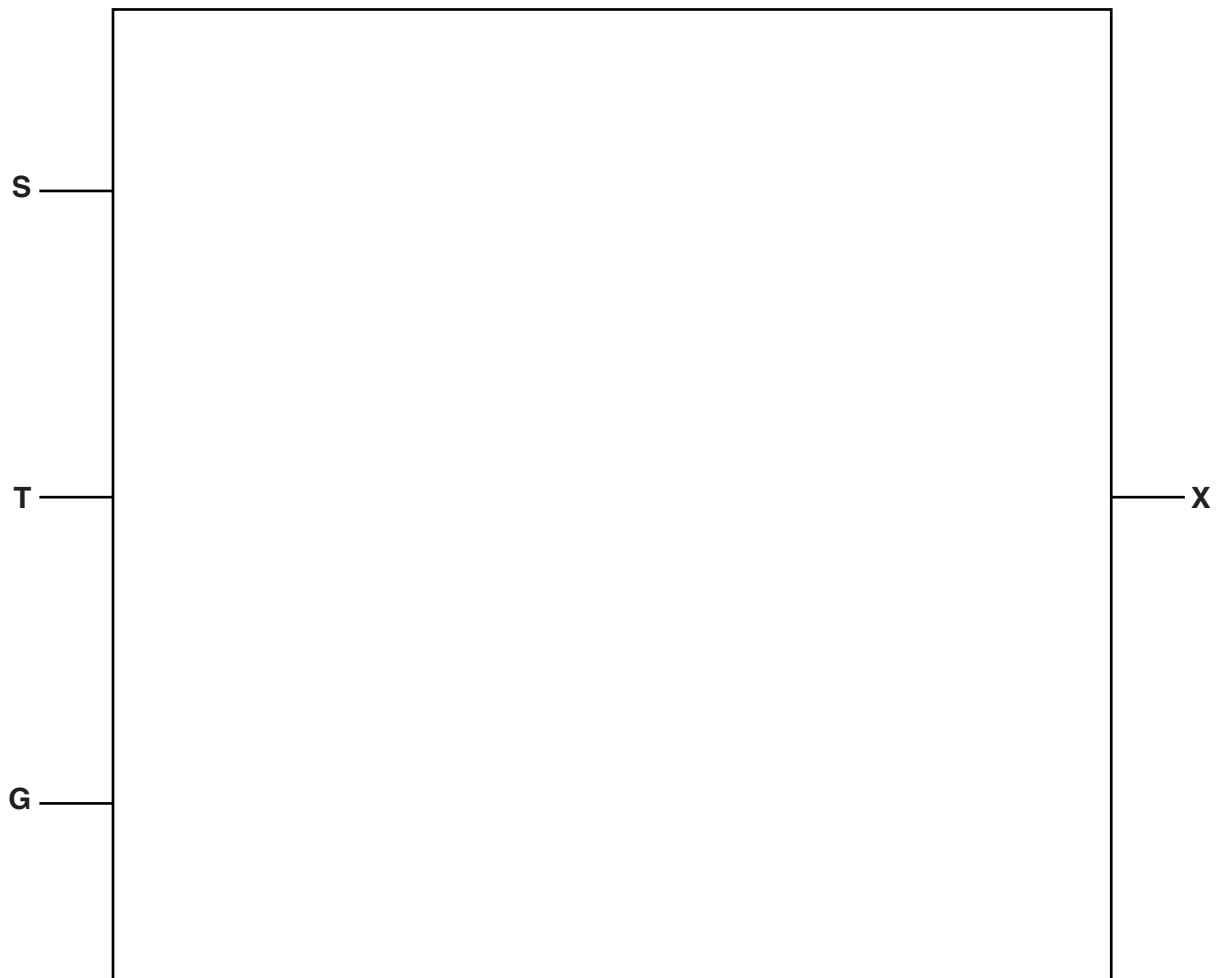
X has the value 1, if:

either sound level \geq 90 dB **and** temperature \geq 35°C

or temperature \geq 35°C **and** oxygen level $<$ 75%

or sound level $<$ 90 dB **and** oxygen level \geq 75%

- (a) Draw a logic circuit to represent the above safety system.



(b) Complete the truth table for this safety system.

Inputs			Workspace	Output X
S	T	G		
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

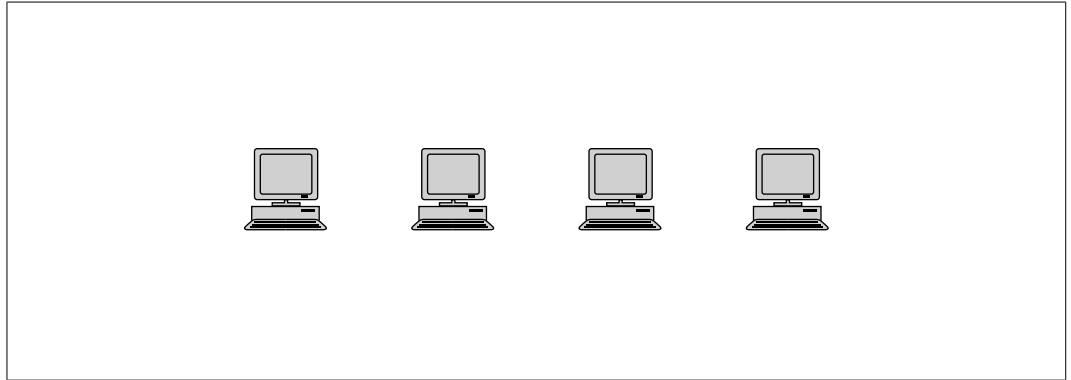
[4]

5 (a) A local area network has four computers.

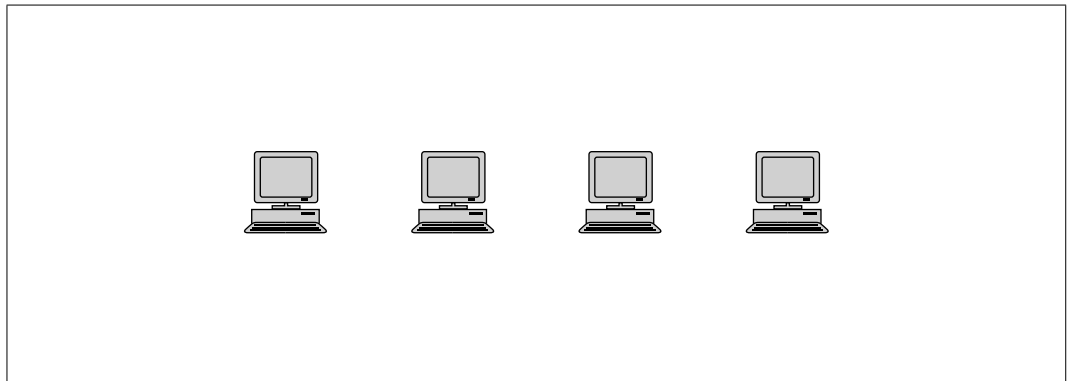
Star, ring and bus are network topologies.

Complete the diagrams to show how the computers are connected in each of these topologies:

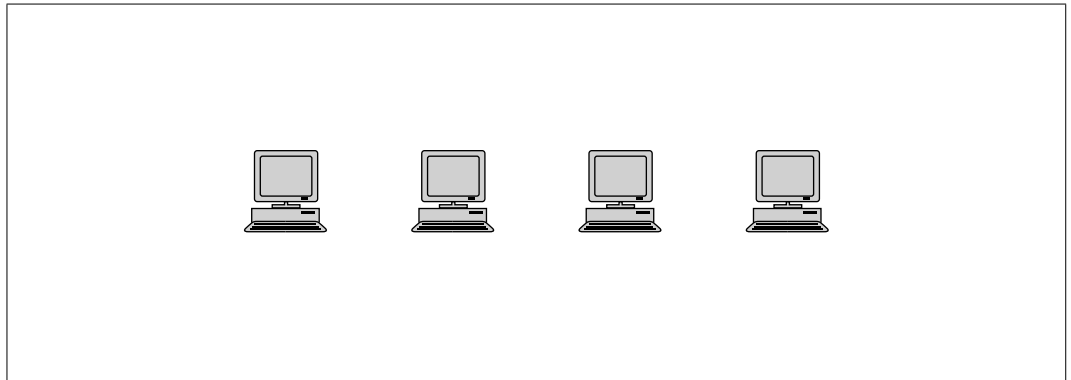
Star



Ring



Bus



[4]

(b) Describe **two** benefits of each of these network topologies:

(i) Star

1

.....

2

.....

[2]

(ii) Ring

1

.....

2

.....

[2]

(iii) Bus

1

.....

2

.....

[2]

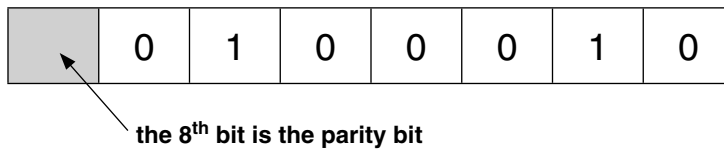
6 A satellite television receiver has a number of channels:

Category	Channels
News	10 to 19
Film	20 to 29
Plays and documentaries	30 to 39
Sport	40 to 49
Comedy	50 to 59
Special interest	60 to 69
Motoring and leisure	70 to 79

A user keys in a choice of channel using a handset.

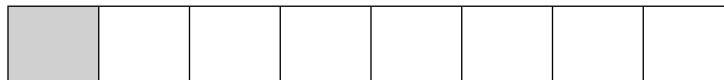
The handset and the receiver are each controlled by a microprocessor.

When a user keys in 34, this value is stored in an 8-bit register as shown below:



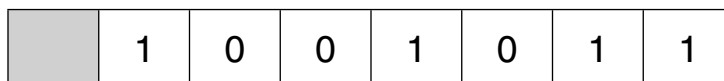
(a) A user keys in 47.

Show the value stored in the 8-bit register.



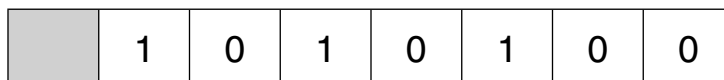
[1]

(b) Calculate which channel has been selected if the 8-bit register contains:



.....[1]

(c) Describe what could happen if the handset transmits the following selection:



.....

[1]

(d) Even parity is used when the handset transmits data to the receiver.

Give the parity bit that is required in the 8-bit register in **part (c)**.

.....[1]

(e) The satellite transmits data. Serial, simplex transmission is used.

Describe what is meant by the following two terms:

Serial

.....

.....

Simplex

.....

.....

[2]

7 An electricity power station is monitored and controlled by a computer system. Staff at the power station can use the computer system to monitor and control what is happening from a central control room.

The computer system was first installed in 1995. Both hardware and software have not changed significantly since then.

(a) Give **four** reasons why the power station management have decided to replace the entire computer system.

- 1
-
- 2
-
- 3
-
- 4
-

[4]

(b) Below are four descriptions of how changeover to a new computer system can be achieved.

Name each method of changeover.

Description	Name of method
Immediately introduce the new system all in one go; the benefits of the new system are noticed straight away.	
A company with a number of departments introduces the new system, one department at a time, to see how it works.	
The new and old system are run together; if the new system fails, the old system is still available as a back-up.	
The new system is introduced one part at a time; once a part is shown to work, the next part is introduced. This continues until the whole of the old system has been replaced.	

[4]

8 A student is sitting an A level Computing exam paper.

He makes the following five statements.

Explain why all five statements are **incorrect**.

(i) "Information being read from a number of barcodes at a POS terminal is an example of batch processing."

.....
.....
.....[1]

(ii) "Typing in an email address twice into a computer to check it is correct is an example of validation."

.....
.....
.....[1]

(iii) "A queue is an example of a LIFO structure."

.....
.....
.....[1]

(iv) "ROM is an example of a temporary, volatile memory."

.....
.....
.....[1]

(v) "Full duplex data transmission involves sending data in one direction only."

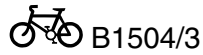
.....
.....
.....[1]

- 9 A manufacturer makes bicycles. Manufacture consists of four stages. Each bicycle is monitored as it moves through the four stages.

Stage	Description
1	welding the metal parts together
2	painting the metal components
3	final assembly of all the parts
4	quality control

Each bicycle has a unique code. Four model types, A, B, C and D are manufactured. Each code consists of the model type followed by four digits.

A computer screen in the office shows the current stage of each bicycle. A labelled graphic is used to identify each bicycle. The graphic's label consists of the bicycle's code together with a suffix to indicate the current stage. For example, bicycle B1504 at stage 3 is represented by:



- (a) Data for four bicycles currently being made are shown below:

Bicycle code	B1504	A0046	B1600	D0088
Stage	3	1	3	4

Complete the screen display:

A				
B			 	
C				
D				
	1	2	3	4

[2]

- (b) Each bicycle is made to a customer's own specification. When the customer places the order, additional data such as colour, frame size and number of gears are stored.

A week after placing their order, a customer calls the office to confirm the number of gears they requested. This query needs to be answered quickly.

Describe features that the screen display needs to have without having all the bicycle data permanently displayed.

.....
.....
.....
.....
.....[2]

- (c) Each stage of a bicycle's manufacture is controlled by a computer system.

Robots are used at the welding, painting and final assembly stages (stages 1 to 3). Bicycles are moved from one stage to the next on a conveyor belt.

The computer system is updated with the current stage of each bicycle as it is manufactured.

Describe the hardware and software needed to do this.

.....
.....
.....
.....
.....
.....
.....
.....
.....[4]

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