Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

COMPUTING **9691/12**

Paper 1 **October/November 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.

Cambridge International Examinations

[Turn over

1 (a) A student is monitoring an experiment for her science project. She has collected and stored a large amount of data. She has to produce a report showing all her results in a suitable format.

The school has different types of software available for student use. These are all generic application software.

(i) Name **three** types of generic software the student could use in the production of her report. Justify your choice of software in each case.

Type of software 1 ....

Justification ....

....

....

Type of software 2 ....

Justification ....

....

....

Type of software 3 ....

Justification ....

....

....

[6]

(ii) State whether the generic software that you named in **part (a)(i)** is more likely to be off-the-shelf or custom-written.

.... [1]

(iii) Describe **two** benefits to the school of providing this type of software.

1 ....

....

2 ....

....

[2]

(b) The examination board provides the school with software to record and submit the students' marks. The examination board paid a programmer to produce this software.

   (i) State whether this software is off-the-shelf or custom-written.

   .... [1]

   (ii) Describe **two** benefits to the examination board of this type of software.

   1 ....

   ....

   2 ....

   ....
   [2]

2 Describe the differences between a command line interface (CLI) and a graphical user interface (GUI).
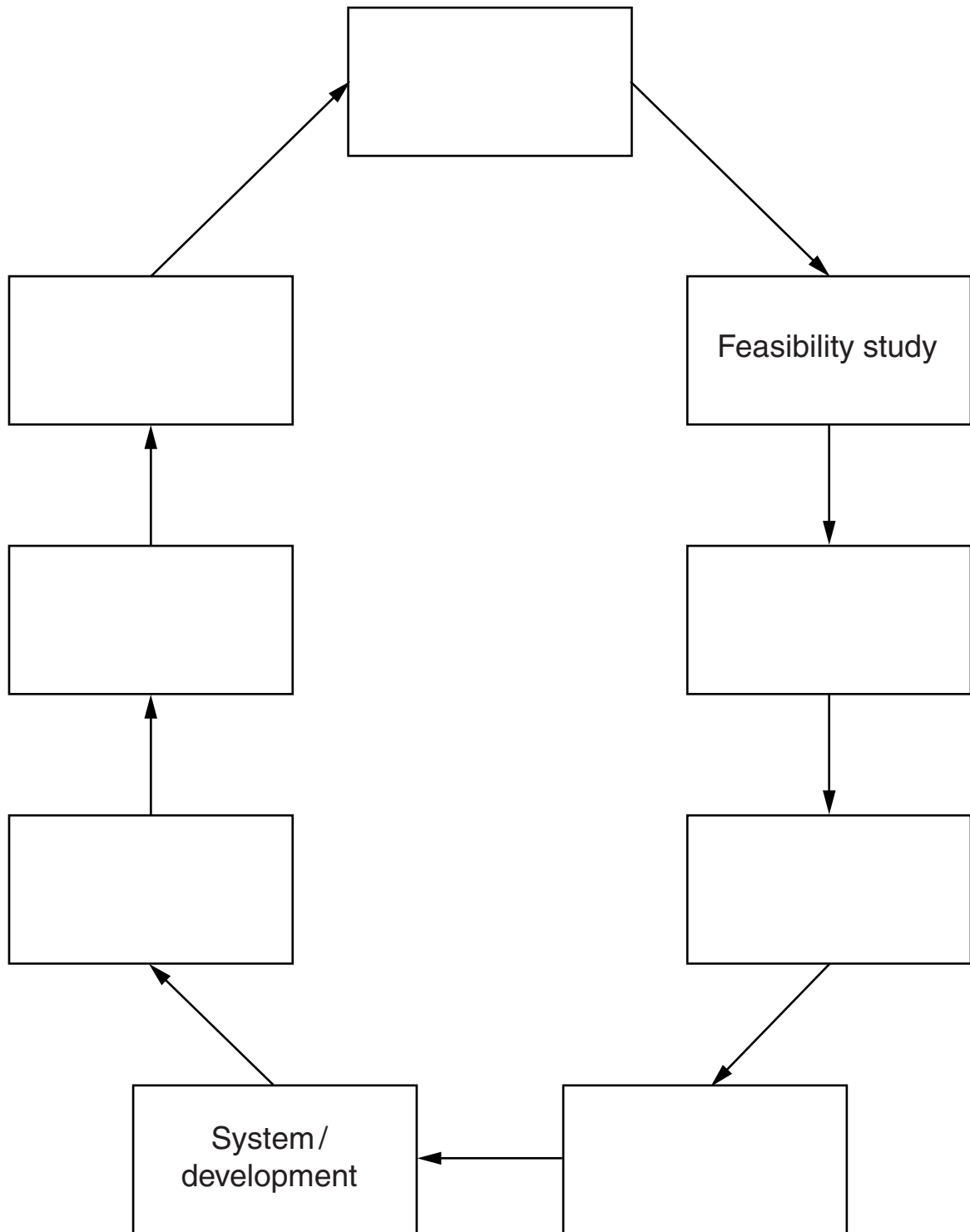
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   .... [4]

3 An outline of the system life cycle is shown below.

Complete the diagram.

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                    ┌──────────────┐
              ┌────▶│              │────┐
              │     └──────────────┘    │
              │                         ▼
    ┌──────────────┐           ┌──────────────┐
    │              │           │  Feasibility │
    │              │           │    study     │
    └──────────────┘           └──────────────┘
          ▲                           │
          │                           ▼
    ┌──────────────┐           ┌──────────────┐
    │              │           │              │
    │              │           │              │
    └──────────────┘           └──────────────┘
          ▲                           │
          │                           ▼
    ┌──────────────┐           ┌──────────────┐
    │              │           │              │
    │              │           │              │
    └──────────────┘           └──────────────┘
          ▲                           │
          │                           ▼
    ┌──────────────┐           ┌──────────────┐
    │   System/    │◀──────────│              │
    │ development  │           │              │
    └──────────────┘           └──────────────┘
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[5]

4 **(a)** Five descriptions and two types of memory are shown below.

Draw a line to link each description to the appropriate type of memory.

Description   **Type of memory**

| memory that is non-volatile |

| memory that allows its contents to be altered as well as read |

RAM

| memory that is used to store the operating system or the BIOS |

| memory that is volatile |

ROM

| memory that stores part of the operating system currently in use |

[5]

(b) A digital camera has three types of memory:

- RAM
- ROM
- solid state

Describe the **purpose** of each type of memory in the camera.

RAM ....

....

ROM ....

....

Solid state ....

....
[3]

(c) Describe **two** methods of transferring the photographs from the digital camera to a computer.

1...

....

2...

....
[2]

(d) After the photographs have been transferred, software is used to compress the files.

(i) State what is meant by file compression.

....

....[1]

(ii) Give **one** reason why file compression is used.

....

....[1]

(e) Describe how buffers and interrupts are used when transferring the photograph files from the digital camera to the computer.

....

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....

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....[4]

5 Six computer terms and six descriptions are shown below.

Draw a line to link each computer term to its correct description.

Computer term	Description

batch processing

software that allows a computer to communicate with a device

formatter

software that manages hardware and software resources

hardware driver

software that searches for malware signatures that have been attached to executable programs

protocol

data are collected together and then processed in one go

operating system

software that prepares a storage device for read/write operations

virus scanner

an agreed format or set of rules decided before transmission of data between devices begins

[5]

6 (a) A company has a security system. The system is computerised and uses:

- digital cameras
- security cards

As a worker approaches a security gate, two actions are taken:

- a photograph is taken of the worker's face
- the worker inserts his card into a reader

Describe how the computer system checks and decides whether the worker is allowed entry.

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.... [4]

(b) All data captured at the security gate are transmitted to the computer using full duplex, serial data transmission.

Define these **two** terms.

Full duplex ....

....

Serial transmission ....

....
[2]

(c) The security system may develop a fault. If this happens, an expert system is used to help identify the problem and suggest a solution.

Describe the function of the following components of an expert system:

Knowledge base ....

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Rules base ....

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Inference engine ....

....

....

[3]

7 A safety system uses three digital sensors A, B and C. The outputs from these sensors feed into a logic circuit. The output from the logic circuit is X.

X has the value 1, if:

either   output from sensor A is 1 **and** output from sensor B is 1

or   output from sensor B is 0 **and** output from sensor C is 0

or   output from sensor A is 0 **and** output from sensor C is 1

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

A ⎯⎯

B ⎯⎯   ⎯⎯ X

C ⎯⎯
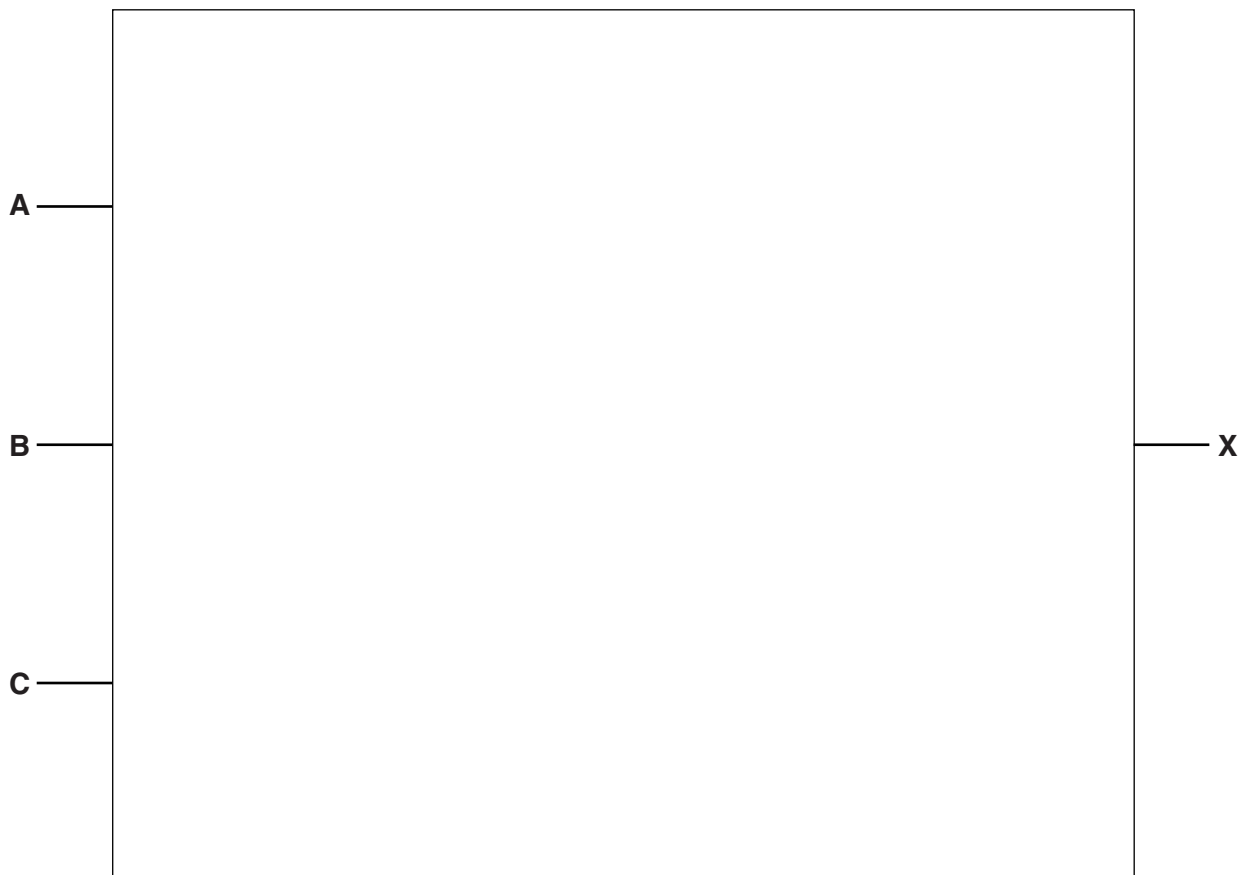
[6]

(b) Complete the truth table.

Input			Workspace	Output
A	**B**	**C**		**X**
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]

(c) The output from the logic circuit is sampled every ten seconds. The output for eight consecutive samples are stored in an 8-bit register.

(i) The register contains:

0	1	0	1	1	1	0	1

Calculate the equivalent denary value.

.... [1]

(ii) Show the contents of the register if the denary equivalent is 78:

[1]

(iii) A fault condition occurs if five **consecutive** values of 1 are sampled.

Give a binary value that shows a fault condition:

[1]

(iv) Give the minimum denary value that shows a fault condition.

.... [1]

8 The track through a railway station is split up into five zones.

The station has four platforms; numbered 1 to 4. The station is in zone 3.

A computerised monitoring system is used to report the speed, zone and platform for each train. The speed is measured in kilometres per hour (kph).

When there are no trains, the monitoring screen shows the following:
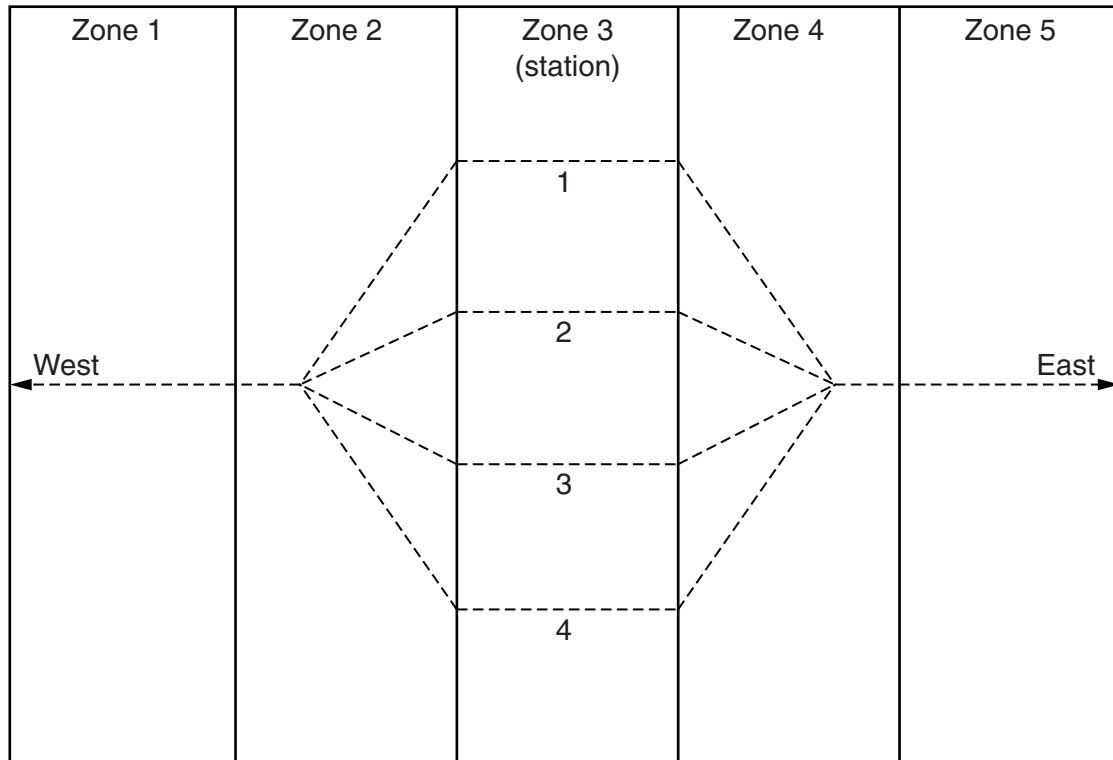
Trains either:

- approach the station
- leave the station
- stand at a platform

The graphic for train TN20 with its data items is shown below:

TN20
0 kph
zone 3
platform 1

(a) The data for the five trains currently in zones 1 to 5 are shown below. A platform value of 0 means the train is in zone 1 or 5.

Train ID	Speed (kph)	Zone	Platform
VK15	50	1	0
TN20	0	3	1
VK30	20	5	0
TX11	0	3	2
TX15	0	3	4

Add to the screen display the essential data item(s) to identify each train:

Zone 1	Zone 2	Zone 3 (station)	Zone 4	Zone 5

1

2

3

4

West

East

[2]

[Turn over
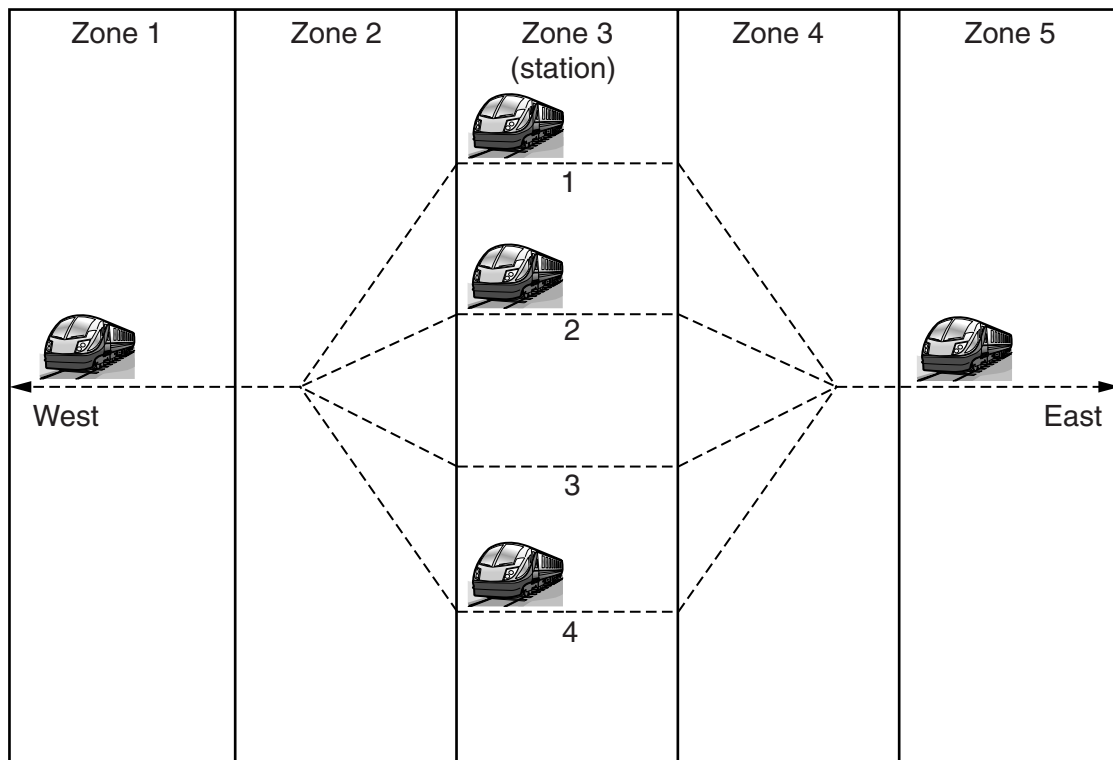
(b) Each train's direction of travel is either East to West or West to East.

Describe how this extra information can be displayed.

....

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....

.... [2]

(c) Every 15 seconds, the system must refresh the graphic and data item(s) shown for each train.

(i) Define what is meant by the term 'refresh'.

....

.... [1]

(ii) State why it is necessary to refresh the graphic and data item(s) shown for each train.

....

.... [1]

(d) The rail track covers a distance of 150 km.

The computer system will be updated with the current status of each train.

Describe the hardware and software that is needed.

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....[4]

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