Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number

Learner Registration Number

Pearson BTEC Level 3 Nationals Certificate, Extended Certificate, Foundation Diploma, Diploma, Extended Diploma

Time 1 hour 45 minutes

Paper reference **31769H**

Computing

UNIT 2: Fundamentals of Computer Systems

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- You may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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Pearson

Answer ALL questions. Write your answers in the spaces provided.

1 Darren owns a small theme park. The theme park uses a range of computer systems to support its daily operations.

Visitors can book and pay for their visits online.

(a) Darren has installed a firewall on the theme park's server.

Give **three** reasons why Darren should use a firewall to protect his data.

(3)

1 .....

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2 .....

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3 .....

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(b) Darren uses a firewall to protect the company data.

Explain **two other** ways he could protect the company data.

(4)

1 .....

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2 .....

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(c) Visitors receive a digital ticket when they book online.

The ticket can be printed or shown on a smartphone.

Figure 1 shows an example ticket.

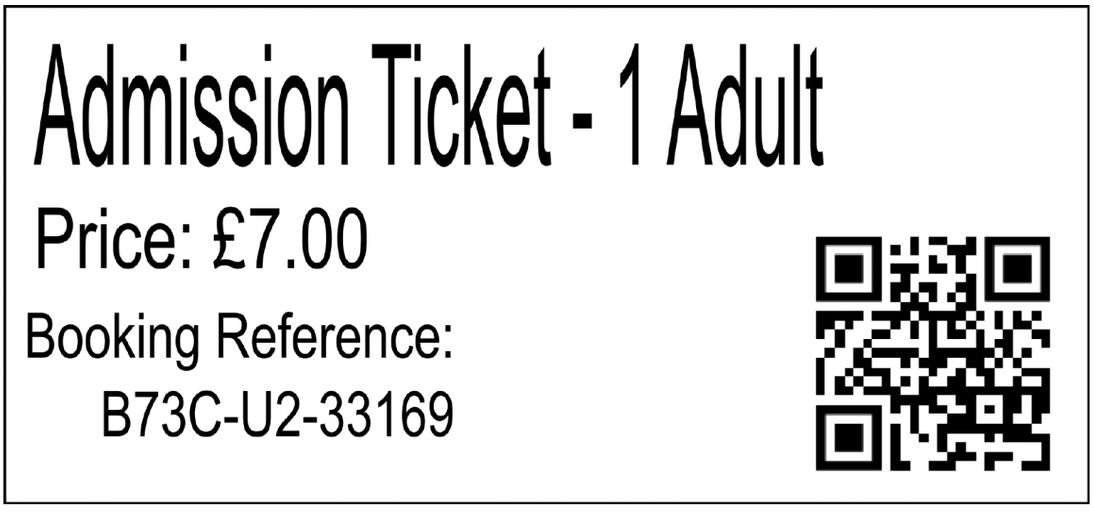

Figure 1

State **two** different input devices and how each would be used to check the ticket when visitors enter the theme park.

(4)

Input device 1

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How it's used

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Input device 2

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How it's used

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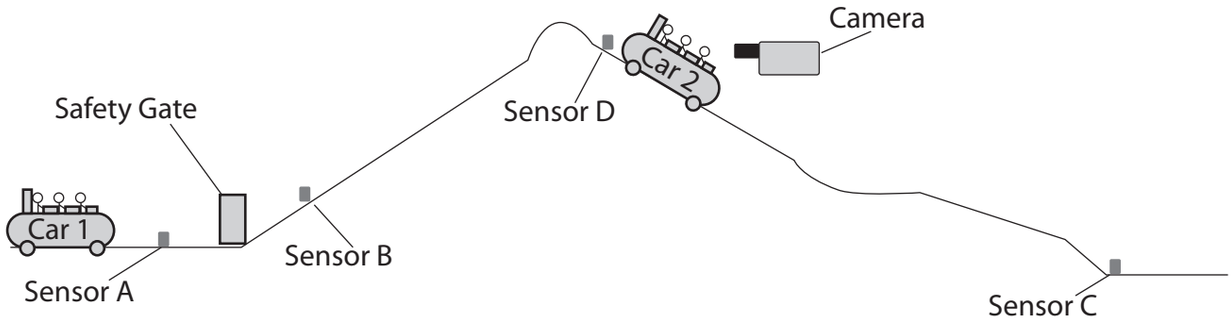
Figure 2 shows the functional specification for part of a ride.

Functional specification



This diagram is not to scale

Sensor A detects when a car gets to the safety gate.

Sensor B triggers a motor to close the safety gate.

Sensor C triggers a motor to open the safety gate for the next car.

Sensor D triggers the camera.

Figure 2

(d) The safety gate only opens if both Sensor A AND Sensor C have been triggered.

Complete the logic table to show the Boolean logic for the gate opening.

(4)

Sensor A	Sensor C	Safety gate

The camera takes photos of each car as it moves down the slope.

Visitors can go to a booth to buy copies of the photos. They can also have them printed onto a range of different souvenirs.

(e) Explain why Darren would use uncompressed images for these photos.

(2)

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(f) The camera is connected to the booth using a wired connection.

Explain **one** reason why a wired connection is used.

(3)

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(Total for Question 1 = 20 marks)

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2 Vicki is a computer systems designer. She designs in-car entertainment systems.

Figure 3 shows a plan for a new system she is designing.

This diagram is not to scale

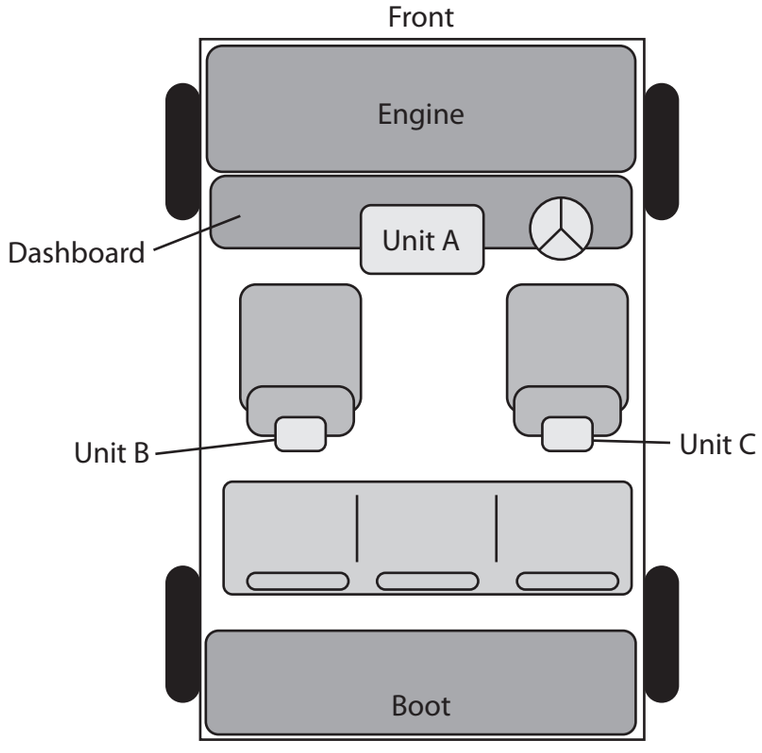

Figure 3

System specifications for Unit A

RAM – 8GB

Processor – Quad Core 3.5GHz (with integrated GPU)

Storage – 1TB Solid State Drive

(a) Explain the purpose of Random Access Memory (RAM).

(3)

(b) Explain **one** benefit of having a large amount (8GB) of RAM in Unit A.

(3)

(c) The system will use cache memory.

Describe **one** function of cache memory.

(2)

(d) The system will allow each of the Units A, B and C to perform different tasks. For example, Unit A may provide navigation for the driver and at the same time passengers could watch different films on Units B and C.

Unit A will do all of the processing for the system.

Describe how the system's operating system (OS) would manage multitasking to make this possible.

(4)

Unit A will use a microprocessor CPU instead of one designed for mobile devices.

(e) Explain **one** benefit and **one** drawback of using a microprocessor CPU for Unit A.

(4)

Benefit

Drawback

(f) Vicki has asked some users to test the system.

The users noticed that when they watched videos on Units B and C there was often a delay.

Describe **two** ways this delay could be reduced.

(4)

1 .....

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2 .....

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(Total for Question 2 = 20 marks)

3 Raul is a network engineer. He installs and maintains computer networks for small to medium-sized companies.

(a) Raul uses specialist utility software to check the data packets on a network.

Describe how packet data helps to make sure that data is sent and received correctly.

(4)

(b) Protocols make sure that the network handles data correctly.

Analyse how protocols govern and control data transmitted over a network.

You should use examples of specific protocols to support your answer.

(6)

(c) Raul uses open source security software on the networks that he installs.

Discuss the **benefits and drawbacks** of using open source security software.

You should provide justification and examples to support your discussion as appropriate.

(8)

(Total for Question 3 = 18 marks)

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QUESTION 4 BEGINS ON THE NEXT PAGE.

4 Marvin is setting up a business that advises people and companies on how to save energy and reduce their carbon footprint.

Marvin and his employees will visit clients at their homes or places of business to assess their energy usage.

The company rents a small office space where the employees work when they are not visiting clients.

The business employs three people (including Marvin).

(a) Marvin must choose suitable computer systems so he and his employees can work effectively.

Discuss the types of computer systems that Marvin could choose.

You should provide justification and examples to support your discussion as appropriate.

(10)

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(b) Marvin and his employees collect and store large amounts of data that includes:

- personal data about customers
- customer energy usage data such as:
  - how much energy they use each day, week, and month
  - how much energy they use at different times of the day
- performance and efficiency data on a range of:
  - electrical and computing devices
  - home appliances (e.g. fridges, kettles etc).

Marvin has chosen to use spreadsheet software to store and manipulate this data.

Evaluate Marvin's decision to use spreadsheet software rather than database software.

You should provide justification and examples to support your response as appropriate.

(12)

(Total for Question 4 = 22 marks)

TOTAL FOR PAPER = 80 MARKS

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