Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number | | | | | |

Candidate Number | | | | |

Specimen Assessment Material for first teaching
September 2020

Time: 1 hour 30 minutes

Paper Reference **1CP2/01**

Computer Science

Paper 1: Principles of Computer Science

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 candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You are not allowed to use a calculator.

Information

- The total mark for this paper is 75.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

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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S 6 8 8 2 7 A 0 1 1 6

Pearson

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

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Networks

(a) Different protocols are used in the 4-layer TCP/IP model.

Complete the table by providing **one** item in each empty space.

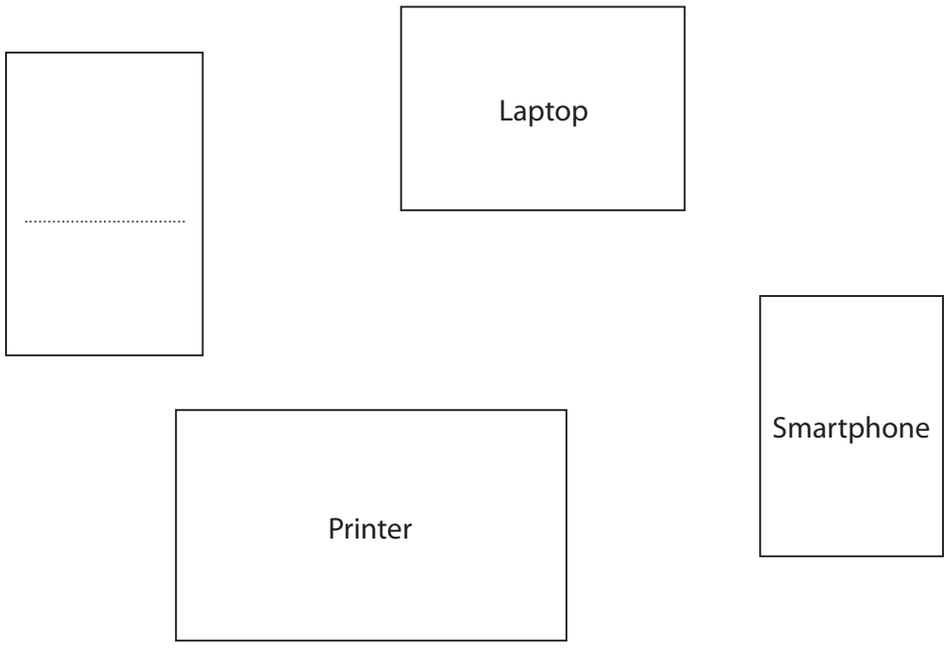
(4)

Layer	Protocol
Application	
	TCP
Internet	
	Ethernet

(b) Computers can be connected using a bus, mesh or star topology.

(i) Draw lines between the devices and label the unnamed device to show a star network topology diagram.

(2)



(ii) Give **two** reasons for using a star topology rather than a bus topology.

(2)

1 .....

.....

2 .....

.....

(c) State **one** reason for splitting data into packets.

(1)

.....

.....

(d) Data is split up into packets for transmission over a network.

Identify the item included in a packet header.

(1)

☒ **A** Data being sent

☒ **B** Decryption key

☒ **C** Media restriction indicator

☒ **D** Packet number

(e) A company needs to secure its network from attacks by its employees.

Explain the best choice of penetration testing the company should use.

(2)

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(Total for Question 1 = 12 marks)

2 Computational thinking

(a) Programmers use abstraction to model the real world.

Define the term 'abstraction'.

(2)

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(b) Programmers use different types of operators in their programs.

Name the **type** of operator for each example.

(3)

<, != .....

+, * .....

AND, NOT .....

(c) Here is an algorithm.

```
1   myNumber = 0
2
3   myNumber = int (input ("Enter a whole number between 1 and 100:"))
4
5   if (myNumber < 1):
6       print ("Too low")
7   elif (myNumber > 100):
8       print ("Too high")
9   elif (myNumber % 10 == 0):
10      print ("Nice round number")
11  elif (myNumber == 100):
12      print ("That's the biggest number")
13  else:
14      print ("Good choice")
```

Complete the table to show the output for the given input.

(4)

Input	Output
200	
33	
100	
0	

(d) Describe **one** difference between a syntax error and a logic error.

(2)

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.....

.....

.....

(e) A merge sort is carried out on this list.

9 4 3 5 5 1 7

(i) State the number of splits required to complete the sort.

(1)

.....

(ii) Here is the list after being split.

Complete the diagram to show the merging steps.

(2)

9	4	3	5	5	1	7

1	3	4	5	5	7	9

(iii) Explain the effect on efficiency of using a merge sort algorithm instead of a bubble sort algorithm on the original list.

9 4 3 5 5 1 7

(2)

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(Total for Question 2 = 16 marks)

3 Data

(a) Complete the table.

(2)

Base	Number of values per digit
Binary	
	16

(b) Identify the reason why data capacity should be expressed in gibibytes rather than gigabytes.

(1)

- ☒ **A** Gibibytes are consistent with the units used for data transmission
- ☒ **B** Gibibytes represent binary multiples
- ☒ **C** More data can be represented in gibibytes
- ☒ **D** Processors have to carry out fewer operations when using gibibytes

(c) Convert the denary number 82 to 8-bit binary.

(2)

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(d) A sound is recorded with these settings:

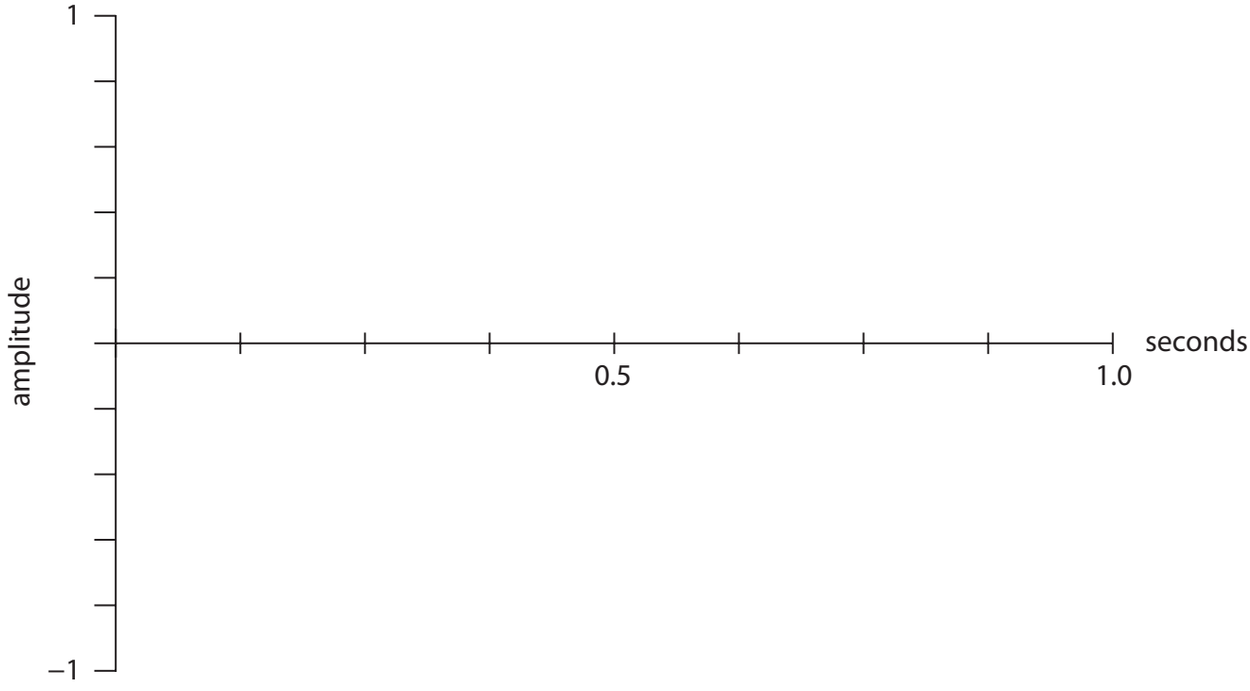
- sample rate: 24 kHz
- bit depth: 4-bit.

Two's complement is used to represent sample values.

The 3000th sample of the sound is represented in binary as 1111

(i) Draw an X on the graph to plot the value of the 3000th sample.

(2)



(ii) State the reason why decreasing the sample interval improves the digital representation of a sound wave.

(1)

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(e) Convert the binary number 0100 1010 to hexadecimal.

(2)

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(f) A 5-colour bitmap image uses 6-bit colour depth.

The image is 96 pixels wide and 128 pixels high.

(i) Complete the expression to show the minimum file size for the image in KiB.

You do not have to do the calculation.

(3)

$$\frac{96 \times 128 \times \boxed{}}{\boxed{} \times \boxed{}}$$

(ii) The file size can be optimised by changing the colour depth.

Give the minimum number of bits that can store 5 colours.

(1)

(g) Complete the table to show the result of the 8-bit binary addition.

(2)

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

(h) Here is a sequence of text.

The quick brown fox jumps over the lazy dog 素早い茶色の狐が怠惰な犬を飛び越えます

Explain why 7-bit ASCII could not be used to represent this text.

(2)

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(Total for Question 3 = 18 marks)

4 Issues and impact

(a) Identify the **two** types of malware that replicate their code.

(2)

- ☒ **A** Key logger
- ☒ **B** Ransomware
- ☒ **C** Trojan
- ☒ **D** Virus
- ☒ **E** Worm

(b) Explain **one** reason why software should be patched regularly.

(2)

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DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

(c) A travel company supports international travellers.

Discuss the legal and ethical issues associated with the company's collection and use of data.

Your answer should consider:

- the rights of data subjects
- the responsibilities of the travel company.

(6)

(Total for Question 4 = 10 marks)

5 Computers

(a) A slow magnetic hard disk may be affected by file fragmentation.

Describe fragmentation and the process of defragmentation.

(3)

(b) A team of developers is using an audit trail when working on a program.

State **two** advantages of keeping an audit trail.

(2)

1 .....

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2 .....

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(c) One function of an operating system is user management.

Describe **one** purpose of user management.

(2)

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DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

(d) The Internet of Things has allowed devices with embedded systems to function independently and to collect and exchange data without the need for humans.

One such device is a battery-powered mower for the garden.

(i) Give **one** way each category could be used by the mower.

(4)

Connectivity .....

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Input .....

.....

Process .....

.....

Output .....

.....

(ii) Explain the best choice of secondary storage for the battery-operated mower.

(2)

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(e) Here is a representation of the contents of main memory.

Memory

Memory location	Value
0000	1100
0011	1000
0100	1111
0101	0111

Draw a flowchart to show the process required to read the contents of memory location 0100 into the CPU.

You must include in your response:

- the buses used
- the contents of each bus.

(6)

(Total for Question 5 = 19 marks)

TOTAL FOR PAPER = 75 MARKS

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