OCR
Oxford Cambridge and RSA

GCSE (9–1) Computer Science
J276/01 Computer Systems

Practice Paper
Time allowed: 1 hour 30 minutes

You may not use:
• a calculator

First name		
Last name		
Centre number		Candidate number

INSTRUCTIONS
• Use black ink.
• Complete the boxes above with your name, centre number and candidate number.
• Answer **all** the questions.
• Write your answer to each question in the space provided.
• Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
• Do **not** write in the barcodes.

INFORMATION
• The total mark for this paper is **80**.
• The marks for each question are shown in brackets **[ ]**.
• Quality of extended responses will be assessed in this paper in questions marked with an *.
• This document consists of **16** pages.

No calculator can be used for this paper

Turn over

2

Answer **all** questions.

1 Hugh owns a website that sells computer components to customers. The customers' details are stored on a database that is connected to the website.

(a) Hugh is concerned about the security of his website.

(i) One threat is the use of SQL injection. Describe the use of SQL injection.

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.... **[4]**

(ii) Explain how Hugh can attempt to prevent SQL injection taking place.

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(iii) Describe **one** additional security threat to Hugh's website.

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.... **[3]**

(b) Hugh's website has a URL and an IP address associated with it.

    (i) Describe **one** difference between a URL and an IP address.

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        .... **[2]**

    (ii) Give **one** benefit to Hugh's customers of accessing the website using a URL rather than using an IP address.

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        .... **[1]**

(c) Hugh runs his company from a single small office where he has two additional members of staff, each with their own computer. The computers are connected together in a network.

  (i) Explain why Hugh's network is a LAN.

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  .... **[2]**

  (ii) The computers are set up as a mesh topology. There is a server that manages the network and acts as a file server and print server, with the printer directly connected to it.

  Complete the diagram showing the connections between the computers in the mesh network.

Computer	Computer

Computer	Server	Printer

  [3]

  (iii) Hugh thinks his network is set up as a client-server network.

  State the role of a personal computer and a server in a client-server network.

  Personal computer ....

  ....

  Server ....

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  [2]

2 Alexandra buys a new computer to enable her to write her University reports using a word processor.

(a) The computer uses Von Neumann architecture.

Tick (✓) **one** box in each row to identify which register the statement best applies to.

Statement	MAR (memory address register)	MDR (memory data register)	PC (program counter)	Accumulator
Stores the address of the next instruction to be run				
Stores the address where the next item of data will be fetched from				
Stores the result of arithmetic calculations				
Is incremented each time an instruction is run				
Stores an item of data that has just been fetched				

[5]

(b) The computer has a Control Unit (CU).

Describe the task performed by the CU.

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(c) Alexandra's computer uses Virtual Memory.

Describe the purpose of Virtual Memory in Alexandra's computer.

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 Turn over

(d) Alexandra wants to improve the performance of her computer by increasing the amount of RAM, installing a faster processor and replacing her magnetic hard disk drive with a solid state drive.

Discuss the impact of making these changes on the performance of the computer.

In your answer you might consider the impact of:

- increasing the amount of RAM
- installing a faster processor
- using a solid state drive

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.... **[8]**

3 OCRApp is an app development company. The employees use the computers to write apps for mobile phones.

OCRApp's employees' computers have systems software.

(a) State why the computers need systems software.

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.... **[1]**

(b) One piece of systems software is the Operating System.

The Operating System performs memory management.

Explain how the OCRApp employees benefit from the Operating System performing memory management.

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.... **[4]**

(c) The Operating System also provides utility software.

One type of utility software is backup software.

(i) Identify **one** additional type of utility software that the employees can make use of and explain how this would be used.

Type of utility software...

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Explanation of use..

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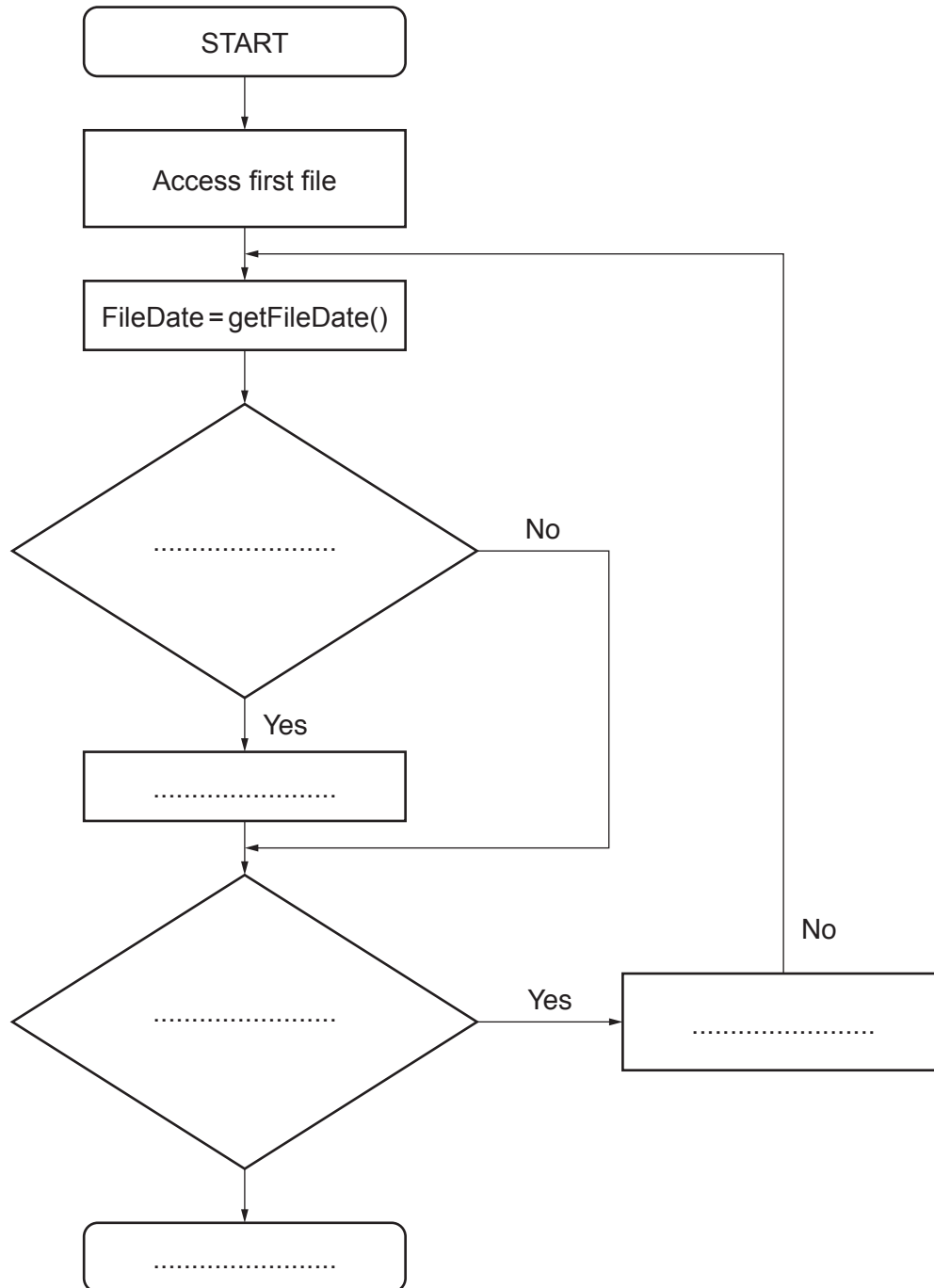**[3]**

8

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OCRApp uses an incremental backup strategy at the end of each working day.

The flowchart describes the stages of an incremental backup.
The function `getFileDate()` returns the date the current file was last accessed.
The function `lastBackupDate()` returns the date of the last backup.

(d) Complete the flowchart by writing the number of the missing statements in the correct flowchart symbols.

Number	Statement
1	STOP
2	Move to next file
3	Is there another file?
4	Copy file to backupFile
5	Is fileDate > lastBackupDate()?

[4]

(e) Using pseudocode, create an algorithm that will write the date of the last backup to a text file called 'dates.txt'.

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4 Holly is writing a computer game. She has found some code online that she could copy and use in her own program.

(a) Discuss whether using this code would be ethical or unethical, justifying your answer.

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(b) Holly is not sure whether to release her software as open source or proprietary software.

(i) Explain why Holly should release her software as open source.

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(ii) Explain why Holly should release her software as proprietary software.

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.... **[2]**

5 A shopping centre allows customers to access free wifi whilst shopping.

(a) The users can access the Internet via the wifi connection.

Identify **three** network hardware devices that can be used to support the wifi connections.

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2 ....

3 ....
[3]

(b) The wifi connection can be set up on one of five different frequency bands.

(i) Identify what is meant by the frequency of a wifi signal.

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.... **[1]**

(ii) Explain why different wifi channels are available.

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.... **[2]**

(c) The shopping centre connects computers and other devices using Ethernet connections. The computers and devices are within a small office.

Describe what Ethernet is and how it supports the transmission of data in the office.

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(d) A computer in the office is used to send a file to the server in the office. The network uses packet switching.

Explain how packet switching is used to transmit the file from the computer to the server.

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(e) The shopping centre has many staff members, and management workers who need to communicate and share files via the network. The network technician has suggested implementing a virtual network.

Describe the benefits of implementing a virtual network in the shopping centre.

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(f) On one specific day the network wifi transmission speed is significantly slower than on previous days.

Describe the factors that can influence the wifi transmission speed.

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END OF QUESTION PAPER

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