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| CANDIDATE NAME: |  |
| CANDIDATE NUMBER: |  |

School Of Coding

**GCSE OCR (9-1) Computer Science**

**Component 1 - Computer Systems &**

**Component 2 - Computational Thinking, Algorithms and Programming**

Practise MIxed Paper

**Time:** 1 hour 30 minutes

**Instructions**

* Use black ink.
* Write your name at the top of this page
* Answer all questions in the spaces provided

**Information**

* The marks for each question are shown in brackets
* The maximum mark for this paper is 80.

1. A laptop computer is supplied with 8GHz quad-core central processing unit (CPU) and 8 gigabytes of RAM.
	1. Briefly explain how a computer makes use of RAM [2]
	2. Give a reason why a computer with 8 gigabytes of RAM could run
	several large programs faster than a computer with 2 gigabytes of RAM [2]
	3. Describe what is meant by a quad-core CPU. State a possible benefit
	of its use. [2]
	4. Describe what is meant by the term 8GHz [2]
2. The TCP/IP stack is formed by four layers:

**Application
Transport
Internet
Link**

* 1. What happens in each layer when a user types in a URL in his web browser? [8]
	2. Name three protocols that are involved when sending an email across the Internet. [3]
	3. For each protocol state the purpose and compare it with the other
	 two protocols [6]
1. Mesh networks are mostly used in places where natural disasters are more likely
to take place.
	1. Explain why a mesh network is suited in this situation and what
	can it provide. [5]
	2. State one advantage and one disadvantage of the mesh network
	compared to the star topology. [2]

1. The following algorithm is made for a player to play a game of two rounds. The function playRound, allows the player to play a round of the game and it returns back the score of the round.

*username = input(“Enter your username”)
 score\_round1 = playRound( username )
 score\_round2 = playRound( username )
 If score\_round1 > score\_round2 then
 final\_score = score\_round1 - score\_round2
 else
 final\_score = score\_round2
 endif
 output( final\_score )*

* 1. State the output of the algorithm if the function playRound returns:
		1. 15 and 30 [1]
		2. 60 and 15 [1]

* 1. The above algorithm needs validation when the username is entered
	Explain the importance of validation in an algorithm. [2]
	2. The username of the player should be *“playerA”*
	Write a pseudocode algorithm to ask for the username input until the valid username has been entered. [3]
	3. Write a pseudocode to write the data in *final\_score* to the text file *resultsData.txt* [4]
1. James has written a program in Python, which is a high-level language and uses a translator to run the program.
	1. Describe the differences of high-level and low-level languages [4]
	2. James can either use an interpreter or a compiler. Describe one feature for each and explain how they can help the programmer. [4]
	3. An IDE usually includes an editor and a run - time environment.
		1. Describe what is an editor and what are its features [3]
		2. Describe what is a run-time environment and its features [2]
	4. James wants to make sure his code is maintainable. Suggest two ways that he can ensure his code is maintainable and explain why. [4]
2. An one-dimensional array stores the data shown in Figure 1.

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| --- | --- | --- | --- | --- | --- | --- |
| 5 | 16 | 8 | 20 | 4 | 2 | 55 |

 *Figure 1*

* 1. Explain how an insertion sort would be performed on the data in Figure 1. [6]
	2. Explain how a bubble sort would be performed on the data in Figure 1. [7]
	3. Name one sorting method other than bubble or insertion sort [1]
1. Computers store data in binary form
	1. Convert the following denary numbers into 8-bit binary and vice versa [4]
		1. 49
		2. 106
		3. 00101011
		4. 10101101
	2. Calculate how many bytes are in 4 MB. Show your work. [2]