**Electronic Answer Document**

**Paper 2 – End of year 12 assessment.**

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| Name | Kenan palmer | Score | / 100 |

Type your name in the box above and the footer of this document before starting.

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| Start time | 10:30 |

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| **1.1** | The Pc loads the next address of the data into the memory address register (MAR). Then the MAR send the memory location down the one-way address bus to main memory. The contents of the memory address is then sent down the bi-directional data bus and is stored in the memory buffer register and then is loaded into the current instruction register | 4 |
| **1.2** | The data may need to be reused again, such as in calculations so a copy of it is made in CIR to be decoded and executed | 2 |
| **1.3** | It can perform one instruction in a clock cycle and uses the stored program concept. So, if you have a device that has constant instructions and programs it would be easier to store it in its own place. | 2 |
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| **2.1** | KAITLEN | 1 |
| **2.2** | Condition 1: The key must be longer than the original text  Condition 2: The key must not be reused | 2 |
| **2.3** | A symmetric key, both the encrypting and decrypting use the same key, while asymmetric uses two different keys to encode data | 1 |
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| **3.1** | 3 | 1 |
| **3.2** | 1500 | 1 |
| **3.3** | Type the letter: B | 1 |
| **3.4** | Parallel communication over long distances is prone to errors and interference with each other, serial communication is much more reliable over larger areas | 2 |
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| **4.1** | I will complete this on paper, scan and send separately. Y/N  Or draw/insert below  A picture containing table, sitting, kitchen, door  Description automatically generated | 3 |
| **4.2** | I will complete this on paper, scan and send separately. Y/N  Or write/draw below  (A.B).(C+D)  A close up of a door  Description automatically generated | 2 |
| **4.3** | I will complete this on paper, scan and send separately. Y/N  Or draw/insert below  A picture containing door  Description automatically generated | 4 |
| **4.4** | It can be used to continuously give a signal or not, and makes up the basis of a memory cell | 1 |
| **4.5** | Clock signal, used to synchronise when the d-flip-flop gives its signal or changes | 2 |
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| **5.1** | The operand stores the value that is being manipulated or used and the addressing mode, and the addressing mode tells where the instruction came from | 2 |
| **5.2** | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Register Contents** | | | | **Main Memory Location Contents** | | | | **R1** | **R2** | **R3** | **R4** | **100** | **101** | **102** | | 10 |  |  |  | 10 | 50 | 80 | | 10 | 40 |  |  | 10 | 50 | 80 | | 50 | 40 | 50 |  | 10 | 50 | 80 | | 50 | 40 | 50 | 1 | 10 | 50 | 1 | | 4 |
| **5.3** | It checks wheatear the value in 101 is 5 times the value in 100 and places a 1 in 102 If it is so | 1 |
| **5.4** | Using a high-level language is much easier for people to understand and much quicker to code as it resembles normal human languages, but in order for it to then run, the high level language needs to be interpreted into a low level language and then into machine code that a computer can then understand and operate. Programming in a low-level language may create more efficient code and the user know exactly what the computer is doing but is much harder for a person to understand and use. Also, in a high level language, one line of code may represent several line of assembly language and is more focus on the logic behind a program than getting the computer to compute it | 4 |
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| **6.1** | Irrational numbers are any number that cannot be written as an integer/integer and is often endlessly long. Therefore as a number stored on a computer can only be store on a finite amount of bits, it can never be truly accurate | 3 |
| **6.2** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Number** | **Integer** | **Rational** | **Irrational** | **Real** | | 5 | X | X |  | X | | Pi |  |  | X | X | | 1/7 |  | X |  | X | |  |  |  |  |  | | 0 | X | X |  | x | | 5 |
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| **7.1** | Parity bits:  Parity bits are an extra bit added to the end of a string of bits (normally 8) that depending on whether you are using even or odd parity, will then make sure there is an even or odd number of 1s respectably, by adding a 1 or a 0 . The receiver then checks that the string of binary has an even or odd number of 1s, if there has been an error and a bit is changed, it will spot it due to the wrong amount of 1s or 0s. However, if 2 of the bits are changed, it will go unnoticed  Majority Voting:  Each bit is replaced with 3 bits of the same type so 101 becomes 111000111  This is then sent, across, if something happens to one bit, and the 3 don’t match, the computer will see if there are more 1s or 0s and assume the most common one is the actual value. However, if 2 bits of the same 3 group change then the error will go unnoticed, this is quite unlikely but still possible. This method also increases the time it takes to send a transmission as the number of bits needed to send triples  Checksum:  Before sending, the sender will analysis the binary string and work out a value from it, it will then send the transmission and the value it worked out. The receiver will then look at the sent binary string and analysis it as well and work out a value from it. If that value and the value sent over are equal, then no error has occurred, and the transmission doesn’t need to be resent. However, working out a checksum delays the transmission, but is much more reliable that parity bits and majority voting, and is faster at transmitting than majority voting | 9 |
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| **8.1** | 30 x200000=600,000  600,000 samples each 16bits long  600,000 x 16 = 9,600,000 bits  9600 kilobits | 2 |
| **8.2** | You need a sampling rate of at least twice the highest frequency, 20,000 is not over double 14500  20000<2x14,500  20000<29,000 | 2 |
| **8.3** | MIDI is instructions for how to replicate the sound, such as pitch note length volume etc, for a synthesizer. The file size of MIDI is much smaller than that of sampled sound or WAV files. It can also be used to create new music quite easily since you just need to change some of the properties of the sound. That is much harder on a sampled sound file | 4 |
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| **9.1** | Wireless network interface card for the device and a woreless router connected to the broadband modem | 2 |
| **9.2** | Carrier sense multiple action / collision avoidance?  A protocol to avoid collisions on shared mediums. When a node wants to transmit, it will check if the line is clear, if not waits a random amount of time, then when it is clear, sends a is request to send message to the desired receiver and the receiver will send a clear to send message when it is ready. | 4 |
| **9.3** | A bus topology is much cheaper to have as it doesn’t require a central hub/switch. A star topology is much more reliable as the bus requires a central ‘spine’ of wires that is critical to its function | 2 |
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| **10.1** | CarREgNo, PartID | 1 |
| **10.2** | Those attributes don’t rely on just the key, one owner can have several cars, so storing them in their own table normalises the database and is much more efficient and doesn’t duplicate data as much | 2 |
| **10.3** | **A close up of text on a white background  Description automatically generatedthe partUsedFor should be PartUsedForJob** | 2 |
| **10.4** | I will complete this on paper, scan and send separately. Y/N  Or draw below  UPDATE job  SET InGarage = “False”,JobDuration=(1:30)  WHERE Job.JobID = 206  AND Job.JobID=PartUsedForJob.JobID |  |
| **10.5** | UPDATE job,PartUsedForJob  SET PartID=12,QuntityUsed=2  WHERE Job.JobID = 206  AND Job.JobID=PartUsedForJob.JobID  AND PartUsedForJob.PartID = Part.PartID | 2 |
| **10.6** | SELECT PartID, description,price QuantityUsed  FROM Job,PartUsedForJob,Part,  WHERE Part.PartID = PartUsedForJob.partID  AND Job.JobID = PartUsedForJob.JOBID  And JobID = 93 | 5 |
| **10.7** | Add another table with partId and make/model of car as fields, it will be a trasnision table, where partID and make/model make a composite key.  Every PartID will have a make/model it relates to and you can have multiple of the same PartID and make/model | 3 |
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| **11.1** | Type the letter: B | 1 |
| **11.2** | Type the letter: A | 1 |
| **11.3** | Exponent = 3  1.0110000 x2^3 = 1011  -8 +2+1 = -5// | 2 |
| **11.4** | Positive starts with 0  58.5-32=26.5  26.5-16=10.5  10.5-8=2.5  2.5-2=0.5  0.5-0.5=0  0111010.1 – floating point  Mantissa = 0.111010  Point moved 6 places left 0110 – exponent  0.1110100 , 0110 | 3 |
| **11.5** | 0.05 | 1 |
| **11.6** | 0.05/13.8 = 1/276 | 1 |
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| End Time | 12:00 |