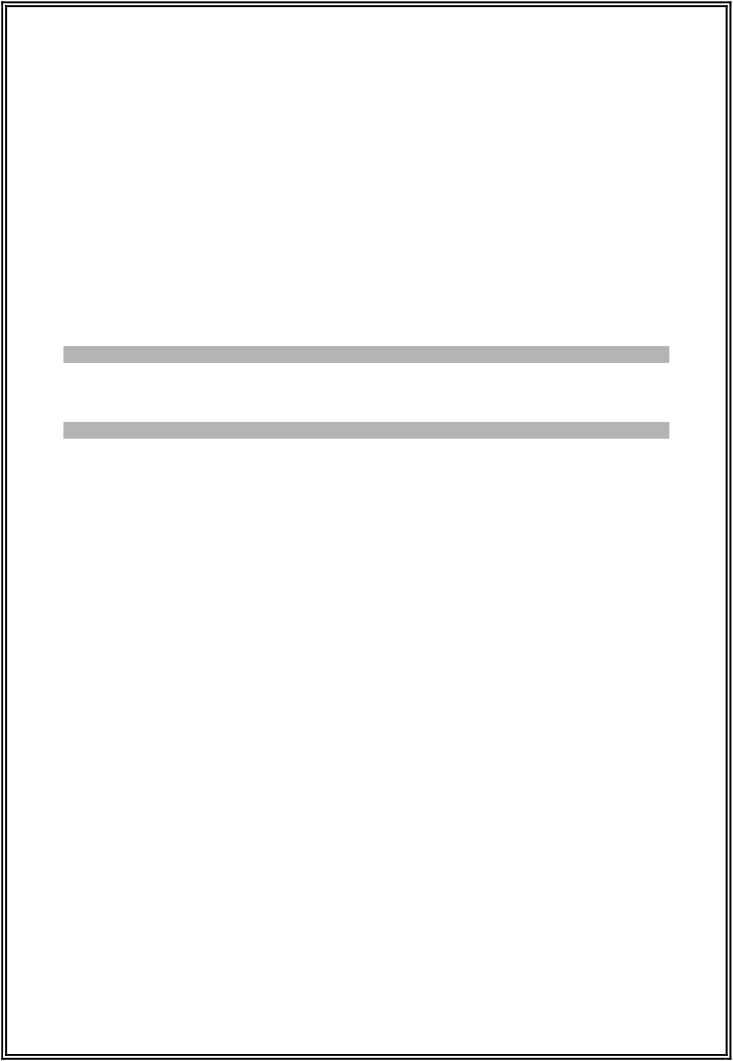
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**GCE AS MARKING SCHEME**



**SUMMER 2017**

**AS (NEW)**

**COMPUTER SCIENCE - COMPONENT 1 B500U10-1**

**INTRODUCTION**

This marking scheme was used by WJEC for the 2017 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

**GCE AS COMPUTER SCIENCE SUMMER 2017 MARK SCHEME**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Q** | **Answer** | **Marks** | **AO1** | **AO2** | **AO3** | **Total** |
| 1a | Any one of:   * The Internet is a world-wide communications infrastructure * A network of networks   Has to imply more than one network | 1 | 1.1a |  |  | 1 |
| 1bi | User Datagram Protocol (UDP) | 1 |  | 2.1a |  | 1 |
| 1bii | Hypertext Transfer Protocol (HTTP) | 1 |  | 2.1a |  | 1 |
| 1biii | Dynamic Host Configuration Protocol (DHCP) | 1 |  | 2.1a |  | 1 |
| 1biv | Any one of:   * Post Office Protocol (POP/POP3) * Internet Message Access Protocol (IMAP) Not SMTP | 1 |  | 2.1a |  | 1 |
| 2 | Any of the following up to a maximum of four:  Fetch:   * The address of the next instruction is copied from RAM into the register (PC to the MAR) * The instruction (at that address) is copied to the MDR * The PC is incremented (so that it holds the address of the next instruction)   Decode:   * The MDR is copied into the Current Instruction Register (CIR) * The instruction / data (opcode / operand) is decoded   Execute   * The instruction is carried out. * Each stage is designed to happen concurrently to maximise resources use (clock ticks and memory)   **For 4 marks, at least one from each, otherwise max 3 marks** | 4 | 1.1b |  |  | 4 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Q** | **Answer** | | | | | | **Marks** | **AO1** | **AO2** | **AO3** | **Total** |
| 3 | Any of the following up to a maximum of four:   * Multiple processors are used (to process a single task). * Many calculations are carried out simultaneously / at the same time * Large problems can be divided into smaller ones,(which are then solved concurrently). * Parallel computer programs are more complex to design and to write than sequential ones * Concurrency introduces several new classes of potential software bugs * Race conditions are the most common class of potential software bug * Communication and synchronisation between the different subtasks creates an overhead. Accept a suitable example of this.   Accepted, not expected:   * The maximum possible speed-up of a single program as a result of parallelisation is known as Amdahl's law: * ( ) = (1)( + 1 ) (1 − ) * ℎ : * ( ) =   ℎ   * = ℎ * =   ℎ ℎ   * The speedup of a program using multiple processors in parallel computing is limited by the time needed for the sequential fraction of the program | | | | | | 4 | 1.1b |  |  | 4 |
| 4a | 1 1  1(answer) 1(carry)  1 |  | 2.1a 2.1a  2.1a 2.1a  2.1a |  | 5 |
| Convert 10100011 into hexadecimal: A3  2 16 | | | | | |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Q** | **Answer** | **Marks** | **AO1** | **AO2** | **AO3** | **Total** |
| 4bi | * For +8 the leftmost bit to indicate the sign. ("0" indicates a positive integer, and for -8 "1" indicates a negative integer) * the rest of the bits are used for the magnitude of the number 8.   +8 = 00001000 -8 = 10001000  Accept answers where the leftmost bit is 1 to represent a positive integer.  Accept answers using a minimum of 5 bits | 1 1  1 |  | 2.1a 2.1a  2.1a |  | 3 |
| 4bii | * From RHS, rewrite the binary number 8 up to and including the first one and change other 1 digits to 0 and 0 digits to 1 00001000 = 11111000   *Or*   * Flip the bits (of 8 binary) and add one 00001000 -> 11110111 ->11111000   Accept a minimum of 4 bits | 1 1 |  | 2.1a 2.1a |  | 2 |
| 4ci | 10.011  Exponent = 0010 0.1001100  Accepted – not normalised | 1  1 1 |  | 2.1a  2.1a 2.1a |  | 3 |
| 4cii | Mantissa = 0.9375 or 15/16, Exponent = 5  Answer =( 0.9375 x 25 )= 30  10 | 1 1 1 |  | 2.1a 2.1a 2.1a |  | 3 |
| 4ciii | Any two from each of the following up to a maximum of four  Advantages of integers (any two of):   * Numbers are stored accurately * Less complex processing * Exact representation of zero   Advantages of floating-point (any two of):   * Very large/small numbers can be stored * Larger range of numbers can be represented * Fractions/decimal places can be represented | 2 2 | 1.1b 1.1b |  |  | 4 |

|  |
| --- |
| **Q** |

**This document was truncated here because it was created in the Evaluation Mode.**