

# COMPUTER SCIENCE

8231  
Paper 1

## General Comments

- *At AS level, there is now an increased requirement for application of knowledge, rather than just recall. Candidates should be aware that when a context is set in the stem of a question, that context is applicable to the whole question, and the subsequent parts of the question are then interrelated and follow on. For example, Question 2 was all about computer security in the banking field. Many answers to part 2(a) and part 2(b) did not take the context into consideration.*
- *Misinterpretation of questions is a common challenge that teachers need to help candidates to address. In relation to this, teachers should also guide candidates as much as possible regarding reading and understanding questions first before answering.*
- *The layout and presentation of work was well organised and neat for the majority of candidates. The presentation of work was generally good. The candidates' handwriting on some scripts were difficult to read. Candidates are encouraged to try their utmost best to write legibly.*
- *Educators are encouraged to desist from selective teaching. Similarly candidates should be advised to desist from selective learning. All aspects of the syllabus are important and are examinable. Candidates are expected to demonstrate more in-depth knowledge at this level of study and for all syllabus topics.*
- *Candidates should still be encouraged to attempt all questions and avoid leaving gaps or un-answered questions.*
- *There is a tendency to repeat information given in the question. For example, in Question 7(b), 11(b)(i). This is a subject that requires precision and exactness in answers. Credit is awarded only where it is worth.*

| Question  | Answer  | Marks |
|-----------|---|-------|
| 1         | <p><b>Most candidates were able to explain the terms and also provided clear examples as required. Some candidates overlooked the examples.</b></p> <p>Data validation <b>two</b> marks, one mark explanation one mark example:<br/>used to check if data satisfies a certain criteria / is reasonable<br/>Example: person's age should fall within a certain range, 0 to 120 years // range check // type check</p> <p>Data verification <b>two</b> marks, one mark explanation one mark example:<br/>data is entered as intended // data integrity is preserved<br/>Example, verifying password by entering it twice // double entry // visual verification</p> | 4     |
| 2(a)(i)   | <p><b>Most candidates knew what data security is.</b></p> <p>Data security max <b>two</b> marks<br/>process of protecting data ...<br/>1 mark from each of the following<br/>... from unauthorised access<br/>... intentional deletion / corruption<br/>... natural disaster<br/>... accidental damage</p>  | 2     |
| 2(a)(ii)  | <p><b>Most candidates struggled to score full marks for this question.</b></p> <p>Data privacy <b>two</b> marks 1 mark from each of the following<br/>ensuring that only people who are entitled to can see the data...<br/>... by the use of passwords / access rights / network security</p>  | 2     |
| 2(a)(iii) | <p><b>A sizeable number of candidates could not explain data integrity as required.</b></p> <p>Data integrity <b>two</b> marks 1 mark from each of the following<br/>Ensuring that no unwanted changes occur to data....<br/>... during data entry or transmission<br/>Minimising duplication of data</p>   | 2     |

| Question | Answer   | Marks |
|----------|--|-------|
| 2(b)     | <p><b>Majority of candidates were better prepared for this question.</b></p> <p><b>Two</b> marks for each method one mark for identification one mark for correct description<br/> Note: these must match but a mark for a valid description can be given if a method is not identified<br/> Examples – accept other valid answers<br/> two step security (1) sending a code to another device as well as entering a password (1)<br/> Encryption of data (1) during transmission over the internet (1)<br/> Using a firewall (1) to reject attempts of unauthorised access (1)<br/> audit of access to the bank account (1) to act on unusual activity (1)</p>                    | 4     |
| 3(a)(i)  | <p><b>The appreciation of the low-level language concept was high despite the general inclination towards machine code. Low-level languages can either be machine code or assembly language.</b></p> <p><b>Two</b> marks 1 mark from each of the following<br/> close to processor instruction set<br/> makes direct use of computer architecture<br/> cryptic // not easily readable by humans // uses mnemonics or binary</p>  | 2     |
| 3(a)(ii) | <p><b>Candidates were generally biased towards machine code only.</b></p> <p><b>Two</b> marks from each of the following<br/> Programs complete tasks in a short time<br/> Memory efficient // program takes little memory space<br/> Gives programmer good access to the working of a computer system</p>   | 2     |
| 3(b)(i)  | <p><b>The understanding of imperative languages was more pronounced than declarative languages in most responses.</b></p> <p><b>Two</b> marks for imperative 1 mark from each of the following<br/> uses sequence of statements<br/> expresses how things are done<br/> codes are normally related to a particular context<br/> make use of assignment statements to locate some information in memory to use it later<br/> simpler to understand than declarative</p> <p><b>Two</b> marks for 1 mark from each of the following<br/> expresses the logic of computation without describing its control flow<br/> uses goal seeking techniques<br/> makes use of back tracking</p> | 4     |
| 3(b)(ii) | <p><b>A sizeable number of candidates struggled to describe how methods are used in OOP.</b></p> <p><b>Three</b> marks 1 mark from each of the following<br/> Objects are instances of a class<br/> An object is a self-contained component which consists of methods and properties to make a particular type of data useful<br/> The behaviour of an object is determined by its class<br/> Objects are created and used during the execution of a program<br/> In OOP, an object can be a data structure, variable or function, which has a memory location.<br/> Methods are programming instructions...<br/> ... that manipulate a data structure</p>                         | 3     |
| 4(a)     | <p><b>This term proved to be known only to a few candidates. Teachers and learners are advised to cover all aspects of the syllabus.</b></p> <p><b>Two</b> marks 1 mark from each of the following<br/> Updates data records in real time<br/> Each transaction must be completed before another transaction can begin<br/> Record locking is used to ensure data integrity</p>  | 2     |

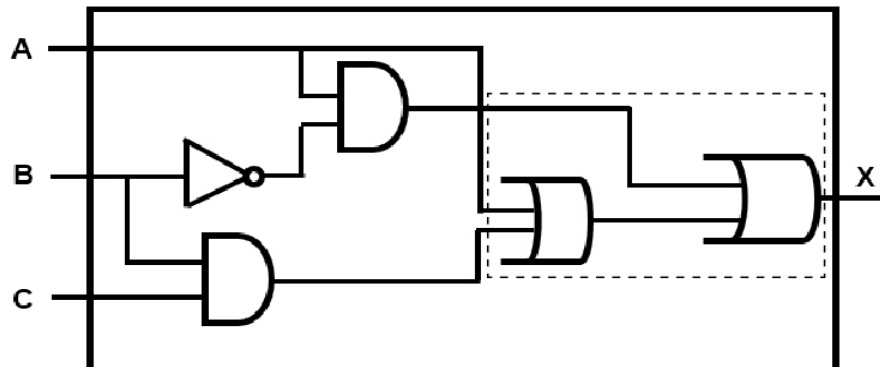
| Question | Answer   | Marks |
|----------|--|-------|
| 4(b)     | <p><b>Most candidates could not justify the use of transaction processing since the term was not well known.</b></p> <p>Two marks 1 mark from each of the following<br/> This system is an online system, so to avoid selling of items that are out of stock ...<br/> ... each transaction has to update the system before the next transaction is carried out.</p>  | 2     |
| 5(a)(i)  | <p><b>Most candidates were better prepared for this question.</b></p> <p>Controls all other parts of the processor.<br/> Fetches instructions and decodes them.</p>  | 2     |
| 5(a)(ii) | <p><b>Most candidates were better prepared for this question.</b></p> <p>Carries out arithmetic / mathematical tasks<br/> Carries out logic operations / comparisons</p>   | 2     |
| 5(b)     | <p><b>Most candidates were better prepared for this question.</b></p> <p>The Program Counter contains the address of the next instruction to be fetched.<br/> The address in the program counter is copied to <b>Memory Address Register</b><br/> The instruction is copied from <b>Memory</b> to the <b>Memory Data Register</b> using the address in the Memory Address Register. Instruction in <b>Memory Data Register</b> is copied to <b>Current Instruction Register</b> for decoding and execution.<br/> <b>Program Counter</b> is updated to point to the next instruction.</p> | 6     |
| 5(c)     | <p><b>Most candidates were better prepared for this question.</b></p> <p>Four marks 1 mark from each of the following<br/> Check the priority of the interrupt<br/> If a higher priority...<br/> stop execution of current process...<br/> ... and save contents of registers in the system stack<br/> execute interrupt routine<br/> continue with process that was active before the interrupt occurred<br/> Note: Max 3 marks if order incorrect</p>  | 4     |
| 6        | <p>Correct answers only</p> <p>Integer<br/> Boolean<br/> Char</p>  | 3     |
| 7(a)     | <p><b>One</b> mark per point max 2</p> <p>Reduces cost of purchasing hardware/software<br/> Reduces cost of maintaining hardware/software<br/> Data security is provided as part of the service not by the organisation<br/> Increased accessibility // available anywhere with an internet connection</p>   | 2     |
| 7(b)     | <p><b>Although most candidates could identify SaaS, only a few managed to describe the concept as well as giving the correct example.</b></p> <p>Software as a Service<br/> Application software available for use over the internet<br/> For example, accounting software etc.<br/> Allow examples such as googledocs etc.</p>  | 3     |

**A sizeable number of candidates were well prepared for the logic gates question.**

8(a)

1 mark for each correct logic gate (shape, sequence and input/output) (max: 4 marks)

4



Note: Allow for 2 marks a correct three input OR gate to replace the two separate two input OR gates.

8(b)

1 mark per each correct pair of outputs Note: no follow through from the circuit

4

| A | B | C | X |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

9(a)(i)

Two marks

1 mark for working e.g.  $64 + 8 + 4 + 2$

1 mark correct answer  $01001110_2$  /  $01001110$  Note: do not accept 1001110

2

9(a)(ii)

**Although most candidates had a rough idea of the concepts, most candidates could not properly distinguish the two as required.**

Two marks 1 mark from each of the following

Unicode represents a greater range of characters than ASCII

Unicode uses 8 – 32 bits per character whereas ASCII uses 7 bits per character

Unicode can represent characters from different languages whereas ASCII cannot

2

9(b)

Three marks

1 mark for working e.g. showing 12 bits split into 3 groups of 4 bits

1 mark all 3 correct 7F2

2

|           |  |   |
|-----------|--|---|
| 9(c)      | <p><b>A sizeable number of candidates could not score full marks. There was a general misconception that machine code takes up more space than assembly language.</b></p> <p><b>Three</b> marks 1 mark from each of the following</p> <p>It is much easier to remember/write codes in hexadecimal than in binary<br/> It is easier to debug programs<br/> Error messages are displayed in hexadecimal which is easier to read and understand than binary.</p>  | 3 |
| 10(a)     | <p><b>This question proved tricky to most candidates as candidates protocols that are only applicable if there is a connection to the internet. This was a typical AS Level question that requires in-depth knowledge and good application of context information.</b></p> <p>One mark line with terminators</p> <ul style="list-style-type: none"> <li>• Hyper Text Transfer Protocol (HTTP or HTTPS)</li> <li>• Transmission control Protocol (TCP)</li> <li>• Packet switching</li> <li>• Circuit switching</li> <li>• Simple Mail Transfer Protocol (SMTP)</li> <li>• Post Office Protocol 3 (POP3)</li> <li>• File Transfer Protocol (FTP)</li> </ul> | 1 |
| 10(b)(i)  | <p>Correct answer only<br/> Router</p>   | 1 |
| 10(b)(ii) | <p><b>Three</b> marks 1 mark from each of the following</p> <p>The packet is sent to the router<br/> Then packet switching is used<br/> Each packet is sent separately<br/> Not necessarily over the same route</p>  | 3 |
| 10(c)     | <p><b>Most candidates struggled to score full marks. Candidates seemed to not know that devices should wait for a random time before attempting to retransmit.</b></p> <p><b>Four</b> marks 1 mark from each of the following</p> <p>Carrier Sense Multiple Access / Collision Detection<br/> A device checks to see if the line is free<br/> Device transmits data and checks for a collision<br/> If a collision is detected transmission aborted...<br/> ... and jamming signal sent<br/> Device waits a random time before attempting retransmission</p>   | 4 |
| 11(a)     | <p><b>Most candidates misused the terms files and records. It is essential that candidates understand the technical language associated with the subject and that these technical terms are used appropriately in responses.</b></p> <p><b>Two</b> marks 1 mark from each of the following</p> <p>in serial access records are held in no particular sequence<br/> in sequential access records are sorted into key sequence</p>   | 2 |
| 11(b)(i)  | <p><b>A sizeable number of candidates needed to be better prepared for this question.</b></p> <p><b>Two</b> marks 1 mark from each of the following</p> <p>used for direct access to records<br/> records stored and retrieved according to disk address // relative position in file<br/> used for interactive systems where immediate access /quick response time is required</p>  | 2 |

|            |  |   |
|------------|--|---|
| 11(b)(ii)  | <p><b>Most candidates could not explain the procedure of how records are added in a random access file.</b></p> <p><b>Three</b> marks 1 mark from each of the following</p> <p>use hashing on the key field...<br/> ...to calculate an address<br/> ... insert record at that address<br/> if address already has a record then overflow will occur...<br/> ... record will be inserted at the next free address / in an overflow area</p>   | 3 |
| 12(a)      | New master file<br>(Accept: son)   | 1 |
| 12(b)      | File generations   | 1 |
| 13         | <p><b>The mark acquisition for this question were very encouraging.</b></p> <p>Max <b>Six</b> marks</p> <p>Input Max 2 marks, 1 mark for correct input of 3 variables<br/> Water, Flavouring, Labour, Packaging, Refrigeration<br/> SellingPrice</p> <p>Calculate Max 2 marks, 1 mark for correct calculation of manufacturingCost, 1 mark for correct calculation of Profit<br/> ManufacturingCost = Water + Flavouring + Labour + Packaging + Refrigeration<br/> Profit = SellingPrice – ManufacturingCost</p> <p>Output Max 1 mark<br/> Profit</p> <p><b>One</b> mark for using meaningful variable names</p> | 6 |
| 14(a)(i)   | <p><b>Most candidates had an idea of what was happening in line 3 but could not score marks because they did not mention the name of the array and the data type. Candidates should be aware that when a context is set in the stem of a question, that context holds good for the whole question and the subsequent parts of the question are then inter-related and follow on. This context data need to be used when answering as a way of providing clearer explanations.</b></p> <p>Assigns values to (element one of) an array Pupil<br/> Of type Test_marks</p>   | 2 |
| 14(a)(ii)  | Correct answer only<br>89  | 1 |
| 14(a)(iii) | <p><b>Similar to 14a(i).</b></p> <p>1 mark for logical average with assignment.<br/> 1 mark for reference to the variable pupil at least once.</p> <p>Example<br/> SET average TO (pupil[1].mark_1+pupil[1].mark_2+pupil[1].mark_3)/3<br/> Do not penalise BODMAS errors.</p>  | 2 |
| 14(b)(i)   | Correct answer only<br>0   | 1 |
| 14(b)(ii)  | 1 mark identification 1 mark correction<br>Line 3 needs to be changed // FOR loop needs to be changed<br>FOR counter FROM 0 TO 3 DO // FOR counter FROM 1 TO 4 DO  | 2 |