IQM3010

LEVEL 3 · CONTROLLED STAFF DOCUMENT

INTO QUALIFICATIONS

Computer Science

Assessment 1: Written exam

STAFF ONLY · Staff mark scheme and AO1 marking map

Duration
2 hours

Total marks
100

Assessment window

Assessment set
Set S

Audience
Staff only

Release timing
exam release

Exam date

Assessment set ID
2026-S

STAFF ONLY - The complete paper maps to AO1. Credit valid equivalent responses where they satisfy the approved set-specific criteria.

Section A • Multiple-choice questions

Locked section budget: 20 marks. Objective allocation: AO1.

Award 1 mark for each correct answer.

Question	Correct answer
A1	1 mark(s): Correct answer A: The number of symbols available for each digit position.
A2	1 mark(s): Correct answer C: 1101.
A3	1 mark(s): Correct answer B: 8.
A4	1 mark(s): Correct answer D: tera.
A5	1 mark(s): Correct answer B: It represents non-negative values only.
A6	1 mark(s): Correct answer C: 1000.
A7	1 mark(s): Correct answer C: The most significant bit.
A8	1 mark(s): Correct answer A: Invert the subtrahend, add one, then add the result to the minuend.
A9	1 mark(s): Correct answer C: Software gives instructions that hardware executes.
A10	1 mark(s): Correct answer B: Arithmetic logic unit.
A11	1 mark(s): Correct answer A: Program counter.
A12	1 mark(s): Correct answer C: Fetch, decode, execute.
A13	1 mark(s): Correct answer C: Keyboard.
A14	1 mark(s): Correct answer A: Managing hardware resources and providing services to applications.
A15	1 mark(s): Correct answer C: WAN.
A16	1 mark(s): Correct answer A: A single central device.
A17	1 mark(s): Correct answer B: A server provides services to client devices.
A18	1 mark(s): Correct answer A: Using an appropriate encryption and authentication method.
A19	1 mark(s): Correct answer A: Router.
A20	1 mark(s): Correct answer C: HTTPS.

Section B - Computer systems, networks and conceptual computational reasoning

Locked section budget: 30 marks. Objective allocation: AO1.

Question	Approved answer / marking points	Alternative valid responses	Max	AO
B1	1 mark(s): (a) States that the program counter holds the address of the next instruction. 1 mark(s): (a) States that the control unit decodes and coordinates instruction execution. 1 mark(s): (a) States that the ALU performs arithmetic or logical operations. 1 mark(s): (b) States that the PC address is copied to the memory address register. 1 mark(s): (b) States that the MAR address is placed on the address bus and a read signal is sent on the control bus. 1 mark(s): (b) States that the fetched instruction travels on the data bus from memory to the MDR. 1 mark(s): (b) States that the MDR contents are copied to the CIR. 1 mark(s): (b) States that the PC is incremented for the next instruction. 1 mark(s): (c) States that RAM loses its contents when power is removed, whereas secondary storage retains data. Both sides of the contrast are required for this mark. 1 mark(s): (d) Names a valid input device. 1 mark(s): (d) States the device function accurately. 1 mark(s): (e) States one valid operating-system role, such as resource management. 1 mark(s): (e) States a second valid role, such as providing services to applications.	Credit equivalent valid responses where the computing meaning is clear.	13	AO1

Question	Approved answer / marking points	Alternative valid responses	Max	AO
B2	1 mark(s): (a) Identifies the local network as a LAN. 1 mark(s): (a) Identifies the central switch arrangement as a star topology. 1 mark(s): (b) States that the client requests the web service and the server provides it. 1 mark(s): (b) States that peer-to-peer devices can provide services directly without a dedicated server. 1 mark(s): (c) Explains that encryption protects transmitted data or authentication restricts access. 1 mark(s): (c) States that a switch forwards frames within a local network. 1 mark(s): (c) States that a router forwards packets between networks. 1 mark(s): (d) States that HTTPS is HTTP secured for the web request, for example using TLS. 1 mark(s): (e) Names application and states its role in user/network services. 1 mark(s): (e) Names transport and states its role in end-to-end delivery. 1 mark(s): (e) Names network and gives its routing role. 1 mark(s): (e) Names link and gives its local-delivery role.	Credit equivalent valid responses where the computing meaning is clear.	12	AO1
B3	1 mark(s): (a) Identifies the active weights 32, 8, 4 and 1 (with zero weights for 16 and 2). 1 mark(s): (a) Shows the correct sum 32+8+4+1. 1 mark(s): (a) Gives decimal result 45. 1 mark(s): (b) Shows groups 0010 and 1101. 1 mark(s): (b) Gives hexadecimal 2D.	Credit equivalent valid responses where the computing meaning is clear.	5	AO1

Section C - Structured conceptual problem solving, algorithms, efficiency and representations

Locked section budget: 50 marks. Objective allocation: AO1.

Question	Approved answer / marking points	Alternative valid responses	Max	AO
C1	1 mark(s): (a) Low-level language is machine-specific or directly related to hardware instructions. 1 mark(s): (a) High-level language is more readable or portable and abstracts machine details. 1 mark(s): (a) Gives a second accurate low-level characteristic, such as direct hardware/register control. 1 mark(s): (a) Gives a second accurate high-level characteristic, such as readable structured notation or portability. 1 mark(s): (b) Shows ordered steps explicitly. 1 mark(s): (b) Shows decisions/conditions explicitly. 1 mark(s): (b) Shows repetition/loops explicitly. 1 mark(s): (b) Identifies input/output or data movement represented by the algorithm. 1 mark(s): (c) Sequence means ordered execution. 1 mark(s): (c) Selection means choosing a path from a condition. 1 mark(s): (c) Repetition means repeating a step/block under an iteration rule. 1 mark(s): (d) Gives a valid reason, such as clearer communication between analysts and programmers.	Credit equivalent valid responses where the computing meaning is clear.	12	AO1
C2	1 mark(s): (a) name is identified as a string/text type. 1 mark(s): (a) mark is identified as an integer or real numeric type. 1 mark(s): (a) marks is identified as a one-dimensional list/array of numeric values. 1 mark(s): (b) Sequence is identified as the ordered assignments/calculations. 1 mark(s): (b) Selection is identified as the IF condition and alternative branches. 1 mark(s): (b) Repetition is identified as the FOR loop. 1 mark(s): (c) total is 218. 1 mark(s): (d) The list stores multiple values under one collection structure.	Credit equivalent valid responses where the computing meaning is clear.	8	AO1

Question	Approved answer / marking points	Alternative valid responses	Max	AO
C3	1 mark(s): (a) Algorithm X is identified as having lower time growth. 1 mark(s): (a) X is identified as linear, O(n), growth. 1 mark(s): (a) The comparison uses the stated n versus n^2 operations. 1 mark(s): (b) Space efficiency is the memory/storage required as input size grows. 1 mark(s): (b) The answer relates storage growth to n or input size. 1 mark(s): (c) Tractable means solvable within feasible resource limits as size grows. 1 mark(s): (c) Intractable means resource requirements become infeasible as size grows. 1 mark(s): (c) Mentions time or space limits as the relevant feasibility constraint. 1 mark(s): (d) Different algorithmic processes can produce different operation or storage growth. 1 mark(s): (d) Both can return the same correct result despite different growth.	Credit equivalent valid responses where the computing meaning is clear.	10	AO1
C4	1 mark(s): Identifies the ordered initialisation and comparison steps as sequence. 1 mark(s): Explains that sequence executes the stated steps in order. 1 mark(s): Identifies the match decision as selection. 1 mark(s): Explains the YES and NO paths from the match decision. 1 mark(s): Identifies the more-items decision as a second selection. 1 mark(s): Identifies returning to the comparison as repetition. 1 mark(s): Explains that repetition stops at a match or when no items remain. 1 mark(s): States that the worst-case comparisons grow linearly, O(n), with list size. 1 mark(s): States that an early match uses fewer comparisons. 1 mark(s): States that a final or absent match gives the worst case.	Credit equivalent valid responses where the computing meaning is clear.	10	AO1

Question	Approved answer / marking points	Alternative valid responses	Max	AO
C5	1 mark(s): (a) Gives signed value +45. 1 mark(s): (a) States MSB 0 indicates a non-negative two's-complement value. 1 mark(s): (b) Inverts 00101101 to 11010010. 1 mark(s): (b) Adds one to give 11010011. 1 mark(s): (b) Identifies 11010011 as -45. 1 mark(s): (c) Represents 19 as 00010011 and inverts it to 11101100. 1 mark(s): (c) Adds one to obtain 11101101. 1 mark(s): (c) Shows 00110110 + 11101101 = 1 00100011. 1 mark(s): (c) Discards the carry to obtain 00100011. 1 mark(s): (c) Gives decimal result 35.	Credit equivalent valid responses where the computing meaning is clear.	10	AO1

Question-to-learning-outcome map

The map records sampled conceptual evidence under guide sections 6.1 and 7.1; it does not imply complete attainment of each outcome. LO30 in C1(c) is conceptual only; C4 interprets a supplied flowchart.

Question	Learning outcome(s)
A1	LO1
A2	LO2
A3	LO3
A4	LO4
A5	LO5
A6	LO6
A7	LO7
A8	LO8
A9	LO9
A10	LO10, LO11
A11	LO11
A12	LO12
A13	LO13
A14	LO14
A15	LO15
A16	LO16
A17	LO17
A18	LO18
A19	LO19
A20	LO20
B1 (a–e)	LO10–LO14
B2 (a–e)	LO15–LO22
B3 (a–b)	LO2
C1 (a–d)	LO23, LO25, LO30, LO31
C2 (a–d)	LO26–LO30
C3 (a–d)	LO32–LO35
C4 (a–d)	LO24, LO25, LO31, LO32, LO34
C5 (a–c)	LO7, LO8