IQM3010

LEVEL 3 · CONTROLLED ASSESSMENT

INTO QUALIFICATIONS

Computer Science

Assessment 1: Written exam

Candidate question paper

Duration
2 hours

Total marks
100

Assessment window

Assessment set
Set S

Response instruction
Write all answers in the separate answer booklet.

Release timing
exam release

Paper

Assessment set ID
2026-S

INTO QUALIFICATIONS LEARNER ID

DELIVERY CENTRE ID (OPTIONAL)

EXAM DATE

ASSESSMENT SET
Set S

Do not open this paper until instructed. Record all answers in the separate answer booklet.

FOR MARKER USE ONLY

Marker initials	**Mark / 100**

Instructions

- Answer all questions.
- Record every answer in the separate answer booklet and identify each response clearly.
- No calculator is permitted. No additional materials or software are permitted.
- No AI is permitted.
- Show all working where relevant.
- The mark allocation is shown beside each question.
- Do not write answers in the question paper.

SAMPLE ASSESSMENT. AO1 throughout. No code writing, debugging, software or practical implementation is required.

Section A - Multiple-choice questions

Section total: 20 marks

A1. Which statement correctly defines a positional number base? 1

A The number of symbols available for each digit position

B The number of bytes reserved for every file

C The number of instructions in a program

D The number of devices on a network

A2. What is the binary representation of decimal 13? 1

A 1010

B 1011

C 1101

D 1110

A3. How many bits are in one byte? 1

A 4

B 8

C 16

D 32

A4. Which prefix denotes the largest quantity? 1

A kilo

B mega

C giga

D tera

A5. Which statement describes unsigned binary? 1

A Its highest bit always means negative

B It represents non-negative values only

C It uses a sign bit and magnitude

D It can represent only fractions

A6. What is 0011 + 0101 in unsigned binary? 1

A 0110

B 0111

C 1000

D 1001

A7. In 8-bit two’s complement, which bit indicates a negative value? 1

A The least significant bit

B The parity bit

C The most significant bit

D The carry bit

A8. What is the usual two’s-complement operation for subtracting one binary value from another? 1

A Invert the subtrahend, add one, then add the result to the minuend

B Delete the most significant bit

C Swap the two operands only

D Multiply both values by two

A9. Which statement best describes the relationship between hardware and software? 1

A Software is physical circuitry

B Hardware and software are unrelated

C Software gives instructions that hardware executes

D Hardware can run without any instructions

A10. Which component performs arithmetic and logical operations? 1

A Control unit

B Arithmetic logic unit

C Program counter

D System clock

A11. Which register stores the address of the next instruction? 1

A Program counter

B Accumulator only

C Memory address bus

D Control unit

A12. Which order names the core stages of the fetch-execute cycle? 1

A Execute, fetch, decode

B Decode, execute, fetch

C Fetch, decode, execute

D Fetch, execute, decode

A13. Which device is primarily an input device? 1

A Monitor

B Printer

C Keyboard

D Speaker

A14. What is a central role of an operating system? 1

A Managing hardware resources and providing services to applications

B Converting every file into binary manually

C Replacing the CPU

D Providing internet access without hardware

A15. Which network normally covers the largest geographic area? 1

A PAN

B LAN

C WAN

D CPU bus

A16. In a star topology, devices usually connect to: 1

A A single central device

B Only each other in a ring

C A satellite with no central point

D One shared CPU register

A17. Which feature is associated with client-server networking? 1

A Each device must provide every service equally

B A server provides services to client devices

C No device can store shared data

D It cannot use authentication

A18. Which measure strengthens wireless-network security? 1

A Using an appropriate encryption and authentication method

B Publishing the network key openly

C Disabling all passwords

D Using an unprotected public SSID only

A19. Which device forwards packets between different networks? 1

A Router

B Switch

C Keyboard

D Monitor

A20. Which protocol is primarily associated with transferring web pages securely? 1

A SMTP

B FTP

C HTTPS

D WAP

Section B - Computer systems, networks and conceptual computational reasoning

Section total: 30 marks

B1. (a) State the roles of the program counter, control unit and arithmetic logic unit. [3 marks] 13
(b) Describe how the next instruction is fetched from main memory and how the address of the following instruction is prepared. Refer to the registers and buses used. [5 marks]
(c) Contrast RAM with secondary storage in terms of retaining data when power is removed. [1 mark]
(d) Name one input device and state its function. [2 marks]
(e) State two operating-system roles. [2 marks]

B2. A college connects personal devices to a secure wireless LAN through a wireless access point (AP). Wired equipment connects to a central switch. A client requests a web page from a college server using HTTPS; the site reaches the remote service through a router. (a) Identify the local network type and the topology around the switch. [2 marks] 12
(b) Explain the client-server roles in the web request and distinguish them from peer-to-peer networking. [2 marks]
(c) Explain one wireless security measure, and state the functions of the switch and router. [3 marks]
(d) Associate HTTPS with its purpose in the stated request. [1 mark]
(e) Name and state the role of the four TCP/IP layers. [4 marks]

B3. The eight-bit value 00101101 is stored by a system. (a) Convert it as an unsigned binary value to decimal, showing the weights 32, 16, 8, 4, 2 and 1 and the sum. [3 marks] (b) Convert this unsigned value to hexadecimal by showing the two four-bit groups. [2 marks] 5

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

Section total: 50 marks

C1. (a) State two characteristics of a low-level language and two characteristics of a high-level language. [4 marks] 12
(b) State four features or information points that pseudocode or a flowchart can communicate about an algorithm before implementation. [4 marks]
(c) State how sequence, selection and repetition are represented in an algorithm description. [3 marks]
(d) Give one reason for using a language-independent representation. [1 mark]

C2. Read this pseudocode. 8

```
name <- "Asha"
mark <- 72
marks <- [72, 65, 81]
total <- 0
FOR each value IN marks
    total <- total + value
END FOR
IF mark >= 40 THEN
    result <- "pass"
ELSE
    result <- "fail"
END IF
```

(a) State a suitable type for name, mark and marks. [3 marks]
(b) Identify one sequence, one selection and one repetition in the pseudocode. [3 marks]
(c) State what total contains after the loop. [1 mark]
(d) State why marks is a list rather than a single scalar value. [1 mark]

C3. Two algorithms solve the same search problem. For input size n=10,000, Algorithm X performs 10,000 comparisons and Algorithm Y performs 100,000,000 comparisons. As n grows, X performs n comparisons and Y performs n^2 comparisons. 10
(a) State which algorithm has lower time growth, give its order of growth, and explain the comparison using n versus n^2. [3 marks]
(b) State what space efficiency measures and how the required memory changes with input size. [2 marks]
(c) State what makes a problem tractable and what makes it intractable as input size grows. [3 marks]
(d) Explain why the two algorithms can have different efficiency while solving the same problem. [2 marks]

C4. Use this flowchart description for a non-empty list: START -> set position to 1 -> compare item at position with target -> [match?] YES: output “found” and STOP; NO: [more items?] YES: increase position by 1 and return to the comparison; NO: output “not found” and STOP. (a) Explain the sequence steps. [2 marks] (b) Explain the two selection decisions and their paths. [3 marks] (c) Explain the repetition and stopping conditions. [2 marks] (d) Explain worst-case growth, early matches and final/absent matches. [3 marks]	10
C5. Use eight-bit two’s-complement values for all parts. (a) State the signed value of 00101101 and explain the significance of its most significant bit. [2 marks] (b) Show the eight-bit two’s-complement representation of -45. [3 marks] (c) Use eight-bit two’s-complement to calculate 54 - 19, showing the inversion, addition of one, binary addition and decimal result. [5 marks]	10