

A-Level Computer Science

Name: _____ Score: _____

1. The stored-program (Von Neumann) idea means that:

- ☐ a single memory holds both the program instructions and the data
- ☐ programs are stored only in the CPU
- ☐ data and instructions use separate memories
- ☐ the program cannot be changed

2. Select **all** the factors that affect CPU performance.

- ☐ clock speed
- ☐ number of cores
- ☐ cache size
- ☐ the colour of the case

Tick every correct option.

3. Assembly language is:

- ☐ a readable form of machine code, with one instruction per machine instruction
- ☐ a high-level language like Python
- ☐ the same as binary data
- ☐ only used for web pages

4. The 8-bit value '00001011' (11) is shifted left by 1 ('LSL #1'). What is the new denary value?

5. The ALU is responsible for:

- ☐ arithmetic and logic operations
- ☐ decoding instructions
- ☐ storing the next instruction's address
- ☐ generating the clock pulses

6. A multi-core CPU is especially helpful for:

- ☐ running several threads/tasks at the same time (parallel work)
- ☐ a single task that cannot be split up
- ☐ reducing the clock speed
- ☐ storing more files

7. What does pass 1 of a two-pass assembler do?

- ☐ builds a symbol table recording each label's address
- ☐ runs the program
- ☐ generates all the machine code
- ☐ optimises the code

8. Shifting an unsigned number left by 3 places multiplies it by what number?

9. How many memory locations can a 16-bit address bus reach?

10. The PC is incremented during the fetch stage so the next cycle fetches the following instruction.

- ☐ True ☐ False

1. a single memory holds both the program instructions and the data

One memory holds instructions and data together; changing the stored program changes what the computer does, with no rewiring.

2. clock speed; number of cores; cache size

Clock speed, cores and cache (plus word size, RAM, storage and bus width) all affect performance. The case colour does not.

3. a readable form of machine code, with one instruction per machine instruction

Assembly uses mnemonics and maps one-to-one to machine code; an assembler translates it.

4. 22

A left shift by 1 multiplies by 2: $11 \times 2 = 22$ ('00010110').

5. arithmetic and logic operations

The Arithmetic and Logic Unit performs calculations and logic/comparisons. Decoding is the control unit's job.

6. running several threads/tasks at the same time (parallel work)

Extra cores run tasks in parallel. A purely single-threaded job benefits more from higher per-core speed.

7. builds a symbol table recording each label's address

Pass 1 records where each label is (the symbol table); pass 2 then generates code, using the table to resolve label references.

8. 8

Shifting by n places multiplies by 2^n , so by 3 places is $2^3 = 8$.

9. 65536

$2^{16} = 65\,536$ locations.

10. True

Incrementing the PC early means it already points at the next instruction by the time this one executes (unless a jump changes it).