MODULE A SYSTEMS ARCHITECTURE · A7 (IGCSE ONLY)

Instruction sets and microprocessors

Original practice questions · 20 marks · ~25 minutes · Cambridge 0478 syllabus 3.1.1(b), 3.1.4

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **20 marks**.

1

Total: 3 marks

A smart thermostat contains a CPU. The CPU is a microprocessor.

(a) State what is meant by a **microprocessor**. **[1]**

(b) State what is meant by an **instruction set**. **[2]**

2

Total: 3 marks

(a) Tick (✓) **one** box in each row to show whether each statement is true or false. **[3]**

Statement	True	False
A microprocessor is a type of integrated circuit on a single chip		
A CPU can execute a command that is not in its instruction set		
Every type of CPU has exactly the same instruction set		

3 **Total: 6 marks**

A training kit has a simple, made-up CPU. The table shows its **whole** instruction set.

Code	Meaning
00	LOAD a number into the accumulator
01	ADD a number to the accumulator
10	STORE the accumulator in memory
11	OUTPUT the accumulator

(a) The codes in the table are in binary. State the name given to the binary commands in an instruction set. **[1]**

(b) An engineer writes a program that needs a SUBTRACT command. Explain why this CPU cannot run the program. **[2]**

(c) The engineer needs the CPU to output the result of 5 × 3. There is no multiply command. Describe how this can be done using **only** the commands in the table. **[3]**

4 **Total: 4 marks**

(a) Complete the sentences about how a CPU uses its instruction set. Use words from the list. **[4]**

ALU	control unit	decoded	executed	RAM	ROM	secondary storage

During the fetch stage, an instruction is copied from ..... into the CPU.

The instruction is then ..... by the ....., which works out which command from the instruction set it is.

Finally, the instruction is ..... .

5 Total: 2 marks

(a) Give **two** examples of commands that could be in a CPU's instruction set. **[2]**

1

2

6 Total: 2 marks

A software company makes a program in machine code for the CPU in a desktop computer. A mobile phone has a different type of CPU.

(a) Explain why the program might not run on the mobile phone's CPU. **[2]**

Total for this worksheet: 20 marks