MODULE A SYSTEMS ARCHITECTURE · A4

The fetch-execute cycle

Original practice questions · ~25 minutes · 20 marks · OCR J277 spec 1.1.1

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: 2 marks

(a) State the purpose of the CPU. **[1]**

(b) State where the CPU fetches each instruction from while a program is running. **[1]**

2

Total: 5 marks

Each statement describes something that happens during the fetch-execute cycle.

(a) Tick (✓) **one** box in each row to show whether it happens when the instruction is **fetched** or when it is **executed**. **[5]**

Statement	Fetch	Execute
The next instruction is brought from memory (RAM) into the CPU		
The ALU adds two numbers together		
The program counter is incremented		
The result of a calculation is stored in the accumulator		
The program counter is used to find the address of the next instruction		

3 **Total: 4 marks**

Each register used in the fetch-execute cycle stores either an **address** or **data**. Instructions count as data.

(a) Tick (✓) **one** box in each row to show what each register stores. **[4]**

Register	Address	Data
Program counter (PC)		
Memory address register (MAR)		
Memory data register (MDR)		
Accumulator		

4 **Total: 5 marks**

A self-service parcel locker runs a program that counts how many lockers are free. The program's instructions are stored in memory, starting at address 40. At the start of a cycle, the program counter holds 40.

(a) State the value held in the program counter after the instruction at address 40 has been fetched. **[1]**

(b) Identify the CPU component that decodes the instruction. **[1]**

(c) The instruction at address 40 is: *add the value stored at address 90 to the value in the accumulator*. Describe what happens when this instruction is executed. **[3]**

5 **Total: 4 marks**

(a) Describe the fetch-execute cycle. **[4]**

Total for this worksheet: 20 marks