MODULE A SYSTEMS ARCHITECTURE · A2

Inside the CPU: ALU, CU, cache and registers

Original practice questions · ~25 minutes · 20 marks · OCR 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: 3 marks

A ticket machine at a railway station has a CPU that works out the price of each ticket.

(a) State what the letters ALU stand for. **[1]**

(b) Give **two** types of operation the ALU carries out. Give an example of each from the ticket machine. **[2]**

2

Total: 4 marks

Tick (✓) **one** box in each row to show which CPU component does each job.

(a) Complete the table. **[4]**

Job	ALU	Control unit	Cache	Registers
Decodes an instruction to work out what it means				
Checks whether one number is greater than another				
Keeps frequently used instructions and data inside the CPU				
Very small, very fast locations that each hold one item the CPU is using right now				

3 **Total: 6 marks**

The CPU in Von Neumann architecture uses the registers below.

(a) Complete the table by describing the purpose of each register. **[4]**

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

(b) Identify the **two** registers from the table that store a memory address. **[2]**

4 **Total: 2 marks**

A weather station's computer is part way through running a program. At one moment the MAR holds 12. A little later the MDR also holds 12.

(a) Explain what the number 12 means in the MAR and what it means in the MDR. **[2]**

5 **Total: 2 marks**

(a) Describe the role of the control unit (CU). **[2]**

6 **Total: 3 marks**

A library's self-service machine runs the same instructions every time a book is scanned.

(a) Explain how cache helps the machine's CPU run these instructions quickly. **[3]**

Total for this worksheet: 20 marks