



EXAM QUESTION PRACTICE PACK

OCR GCSE (9-1)
COMPUTER
SCIENCE

EXAM QUESTIONS

Component 1 Computer systems

1.1 Systems architecture

1 The Central Processing Unit (CPU) may also be referred to as the processor or microprocessor.

(a) State three steps the CPU continuously carries out in a cycle when processing a program.

(3 marks)

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.....

.....

(b) Describe an action the CPU might carry out during its execute phase.

(2 marks)

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.....

(c) The CPU uses the following to perform certain of its functions:

➤ address bus

➤ data bus

➤ control bus

Give the function carried out by each.

(6 marks)

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.....

Total: 11 marks

(Example student responses and mark scheme on p. 68)

2 A Central Processing Unit (CPU) executes programs that are stored in memory.

(a) Rebecca has bought a new computer which is capable of parallel processing. Describe how parallel processing works and how this will benefit Rebecca. **(3 marks)**

.....

.....

.....

(b) A CPU uses three steps in order to run a program: fetch, decode and execute. Complete the following table to explain what happens at each step. **(3 marks)**

Steps	Explanation
Fetch	
Decode	
Execute	

(c) The clock speed of the CPU is measured in cycles per second. If one cycle per second is known as 1 hertz (1 Hz), state how many GHz a clock runs at if it runs at 4000 million cycles a second. **(1 mark)**

.....

Total: 7 marks

(Example student responses and mark scheme on p. 70)

3 A register in a CPU is a place where a small amount of data can be held temporarily.

(a) Describe what is held in the Memory Address Register (MAR). **(2 marks)**

.....

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(b) Another register is the Memory Data Register (MDR). State the purpose of an MDR. **(2 marks)**

.....

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EXAMPLE RESPONSES AND MARK SCHEMES

The student responses

This section shows sample answers from two students. One set (A) is strong, the other (B) weaker. The answers are followed by expert comments (shown by the icon **e**) that indicate where credit is due. In the weaker answers, they also point out areas for improvement, specific problems and common errors.

Component 1 Computer systems

1.1 Systems architecture

Question 1

Student A

- (a) Fetch
Decode
Execute

e This is an exact match to the mark scheme. **3 marks**

- (b) Use the Arithmetic Logic Unit (ALU) to calculate complicated mathematical functions.
Move data from one memory location to another.
Jump to different addresses in a program based on decisions that the CPU makes.

e Award 1 mark for naming any one of these actions and 1 mark for a full description. **2 marks**

- (c) Address bus – used when the CPU needs to read or write to a memory location. It specifies that memory location on the address bus.
Data bus – sends or receives data from memory to allow every component to communicate with other components.
Control bus – send control signals around the CPU to tell the CPU what to do with the data or memory location it is accessing at that time. This includes reading data from a location or writing data to a location

e The three elements are named correctly and expanded clearly. It is nice to see examples used to illustrate the answer in the explanation of the control bus. **6 marks**

Question 1**Student B**

- (a) Fetch–execute cycle
- e Two of the three possible responses are named. 2 marks**
- (b) ALU to calculate
- e This student has not described what could be calculated, so gets only 1 mark. 1 mark**
- (c) Address bus – sends an address to memory.
Data bus – sends or receives data from memory.
Control bus – send signals to control actions of the CPU.
- e This answer gives the bare minimum for each point. In the third point the reference to actions shows slightly more understanding but is not sufficient for the second mark. 3 marks**

Question 1 mark scheme

- (a) 1 mark for each of the following points:
 - fetch
 - decode
 - execute

Hints and tips

As students are asked to ‘State...’, the expected response is one word or a simple phrase for each function.

- (b) Up to 2 marks for one explanation from:
 - Use the ALU... (1)
...to calculate mathematical data. (1)
The total of 2 marks is allocated for the fuller expansion.
 - To move data... (1)
...from one memory location to the CPU, or vice versa. (1)
The total of 2 marks is allocated for the fuller expansion.
 - Jumps/goes to different addresses... (1)
...based on the value in the accumulator. (1)
The total of 2 marks is allocated for the fuller expansion.

Hints and tips

As students are asked to ‘Describe...’, the response is expected to be in some detail and therefore a short phrase will not gain maximum marks.

(c) Address bus

When the CPU needs to read from or write to memory... (1)

...it specifies that memory location on the address bus. (1)

Data bus

Sends to or receives data from memory... (1)

...to move it to and from the CPU. (1)

Control bus

Carries control signals around the CPU... (1)

...to tell the CPU what to do with the selected data / memory location. (1)

Hints and tips

As students are asked to 'Give...'; a response with more than a single word is expected.

Question 2

Student A

- (a) Parallel processing is where more than one instruction can be processed at the same time, enabling a significant increase in the performance of the computer. This is because with multiple CPUs it can begin to fetch and decode another set of instructions while it is processing others.

e An accurate description is communicated well. 3 marks

(b)

Steps	Explanation
Fetch	It fetches the data and instructions from main memory (i.e. RAM) and stores them into registers
Decode	It decodes and organises the instructions into significant parts
Execute	It executes those individual parts of the instructions

e These are clear and accurate explanations for each of the three steps. 3 marks

(c) 4 GHz

e This is the correct answer. 1 mark

Question 2

Student B

(a) Parallel processing means it can carry out several instructions at the same time. Rebecca would find the computer quicker.

e The description of parallel processing is accurate (1). 'Quicker' on its own is not enough to gain the second mark. However, the student puts their response into context (1). **2 marks**

(b)

Steps	Explanation
Fetch	Fetch instructions from RAM for the registers
Decode	It turns it into a language that humans can understand
Execute	It means that the data is processed

e The 'Fetch' explanation is not fluently described, but it gives the important points (1). The response for 'Decode' is inaccurate. The explanation for 'Execute' meets the second criterion for this mark (1). **2 marks**

(c) 4,000,000,000

e This student has not given the response in the requested format, so the mark is not awarded.

Question 2 mark scheme

(a) 1 mark for each of the following points:

- Parallel processing is when multiple CPUs (or cores)...
- ...work together, simultaneously processing the same program.
- This means that certain programs will execute more quickly than they would with a single processor.

Hints and tips

There are 3 marks available, so look for three pieces of information.

(b) 1 mark for each row completed correctly.

Steps	Explanation
Fetch	It fetches the data and instructions from main memory (i.e. RAM) and stores them into registers
Decode	It decodes and organises the instructions into significant parts/the instruction in the current instruction register (CIR) is interpreted
Execute	It executes those individual parts of the instructions/data processing takes place

(c) The correct answer is 4 GHz.