1(a). A computer has a Central Processing Unit (CPU).

Describe what happens during the fetch-execute cycle.

[2]

(b). Complete the table by writing the name of **two** registers used in the fetch-execute cycle **and** the purpose of each register.

Register	Purpose

[4]

(c). Give **three** characteristics of a CPU that can affect its performance.

1

2

3

[3]

2. A car has a 'Follow Me' system that uses a cruise control feature to allow the car to follow the car in front of it. It will keep the same speed and distance without the driver's intervention. The cruise control system is an example of an embedded system.

Explain the reasons why the 'Follow Me' system is an example of an embedded system.

[3]

3. A car comes with many embedded systems, for example parking sensors.

Identify **one** other embedded system that could be found in a car and explain why this is an embedded system.

Example embedded system

Explanation

---

[3]

4. Complete the table by writing the missing definition or name of each of the common CPU components and registers.

CPU component or register	Definition
	Stores the address of the next instruction to be fetched from memory. Increments during each fetch-execute cycle.
CU (Control Unit)	
	Stores the address of the data to be fetched from or the address where the data is to be stored.
	Performs mathematical calculations and logical operations.

[4]

5(a).

i. The table has **five** components of a computer, and **four** statements.

Tick **(✓) one or more** boxes in each row to identify which component(s) each statement describes.

Statement	MAR	MDR	Cache	Program Counter	RAM
It stores a single address					
It stores frequently used instructions					
It is a register					
It stores all currently running data **and** instructions					

[4]

ii. Identify the name of **one** register **not** given in **part (i)** and describe its purpose.

Register _____

Purpose _____

[2]

(b). Computer A has a single core, 3.2 GHz processor.
Computer B has a single core, 1.2 GHz processor.

Explain why Computer A will usually run faster than Computer B.

_____

_____

_____

[2]

6. The following paragraph describes embedded systems.

Complete the paragraph by selecting terms from the list and writing them in the correct places. Not all terms are used.

actuator	applications	change	functions	laptop	larger
lights	microprocessor	processor	range	smaller	washing machine

Embedded systems have limited ..... They are often

built into a ..... machine. Two examples of embedded

systems are a ..... and automated

..... in a car.

[4]

7(a). The specification of two CPUs is shown in **Fig. 1**.

Computer 1	Computer 2
Clock Speed: 1 GHz	Clock Speed: 1.4 GHz
Cache size: 2 MB	Cache size: 2 MB
Number of Cores: 4	Number of Cores: 2

Fig. 1

When running a 3D flight simulator, Computer 1 is likely to run faster than Computer 2.

Using the information in **Fig. 1**, identify **one** reason for this.

---**[1]**

(b). Identify **two** other parts of a computer that are not in **Fig. 1**, which could improve the performance of the computers.

1 _____

2 _____

[2]

(c). Explain **one** reason why the cache size affects the performance of the CPU.

[2]

(d). Identify **two** events that take place during the fetch-execute cycle.

1

2

[2]

END OF QUESTION PAPER