

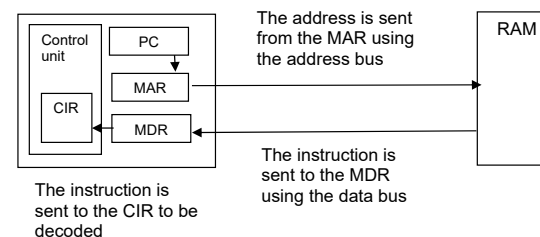
7(a)	Any one from: - Read only memory // ROM - Cache
7(b)	Any three from: - RAM is directly accessed by the CPU. ... whereas secondary storage is not directly accessed by the CPU. - All secondary storage is non-volatile storage. ... whereas RAM is volatile storage.
7(c)	Any three from: - Virtual memory can act as an extension to the RAM . - The secondary storage device is partitioned to create the virtual memory. Pages can be transferred from the RAM to the virtual memory to stop the RAM getting full // ... when the RAM is full.
7(d)(i)	Any two from: - It has no moving parts. - It uses semiconductor chips. - It uses NAND/NOR/Flip-flops technology. - It uses cells and transistors (that are laid out in a grid). - It uses control gates and floating gates. Stores data as electrical charges.
7(d)(ii)	Any two from: - Solid-state drive // SSD - USB flash memory drive - SD card

5(a)	To store data/files/software permanently
5(b)	Compact disk (CD) Digital versatile disk (DVD) Blu-ray disk
5(c)	Any three from: - To store data temporarily - To store data currently in use - To store software currently in use - Data can be accessed faster (than secondary storage) - To speed up the fetch stage (of the fetch-execute cycle)

- 5(d) Any **four** from:
- The diagram shows:
- The registers MAR, MDR and PC
 - Address** sent from PC to MAR
 - ...using address bus (award anywhere for correct use of address bus)
 - ...PC is incremented
 - Address** sent from MAR to RAM
 - Data/instruction** sent from RAM to MDR
 - ...using data bus (award anywhere for correct use of data bus)
 - Data/instruction** sent from MDR to CIR/CU
 - Control unit sending control signal for any part of the process
 - ... using control bus (award anywhere for correct use of control bus)

Example:

PC sends address to
MAR then increments



- 9(a) Any **two** from:
- To store data/files **permanently**
 - ... otherwise, data/programs would need to be downloaded/entered/installed every time the computer was used
 - To allow **software** to be **installed** on the computer
 - For the creation of **virtual memory**
- 9(b) Any **six** from (**Max 3** for one type only):
- Solid-state has no moving parts
 - ... optical does have moving parts
 - Solid-state is faster to **access** data
 - ... optical is slower to **access** data
 - Solid-state uses less power to operate
 - ... optical uses more power to operate
 - Solid-state runs quietly
 - ... optical makes more noise
 - Solid state is more durable/robust
 - ... optical is less durable/robust
 - Solid state storage has a large storage capacity
 - ... optical has a much smaller limit to its storage capacity
 - Solid-state is more expensive **per GB** of data
 - ... optical is cheaper **per GB** of data
 - Solid-state stores data onto silicon chips/transistors using logic (floating/control/NAND/NOR) gates to control the movement of electrons
 - ... optical stores data by using lasers to burning pits and lands onto a disk

4	One mark for each correct type of storage.	
	type of secondary storage	statement
	optical	Pits and lands are created on a reflective surface.
	solid-state	NAND or NOR technology is used.
	magnetic	Platters are spun that are divided into tracks and sectors.
	magnetic	Electromagnets are used to read and write data.
	solid-state	Transistors are used as control gates and floating gates.
	optical	A red or blue laser is used to read and write data.

5(a)	C
5(b)	It is directly accessible by the CPU

8(a)	Any two from: – Data is stored on platters – (Platters) are divided into tracks and sectors – Has components that are spun – Data is read/written using a read/write arm – Data is read/written using electromagnets – Magnetic field determines the binary value – It is non-volatile
8(b)	Any three from: – Flashes data onto chips – Uses transistors – Uses NAND/NOR technology – Uses control gates – Uses flow gates – Controls the flow of electrons – It can be volatile or non-volatile
8(c)	One mark for an example in each storage type e.g.: Magnetic – HDD – Magnetic tape – Floppy disk – Magnetic strip Solid state – SSD – USB drive – SD card – RAM Optical – CD – DVD – Blu-ray

13(a)(i)	– C
13(a)(ii)	Any one from: – Directly accessed by the CPU – Has both volatile and non-volatile storage
13(b)	One mark for each correct term in the correct order: – Random access memory (RAM) – Hard disk drive (HDD) – Pages – Random access memory (RAM) – Virtual memory // Hard disk drive (HDD)

3(a)	One mark for each correctly circled storage device: • Compact disk (CD) • Solid-state drive (SSD) • Hard disk drive (HDD)
3(b)	• C