Q1

Definition	Meaning
Micro-Processor	is an integrated circuit which can perform arithmetic and logical operations. need to memory and I/o ports to operate, general purpose
Micro-Controller	is an integrated circuit which consist of CPU and other components like ROM and RAM and I/o ports single used to control embedded system
Embedded systems	system controlled by special purpose computer ~~system~~ which designed to perform one or few dedicated functions
Mechatronic systems	consists by definition of a mechanical part that has to perform certain motions and an electronic part that adds intelligence to the system
n-bit Processor	Processor can process n bits of data at atime data larger than n-bit has to be broken into n-bit pieces to be processed

Q2:

Compare between Micro Processor Vs Micro Controller

Micro - Processor	Micro-Controller
General purpose	specific purpose and include a micro processor inside
contains no RAM, no Rom, no I/O on the chip itself	contains RAM, ROM and I/o ports
Advantage: its systems are versatile enabling the designer to decide on the amount of RAM, ROM and I/o ports to fit the task	Advantage: used for application in which cost and space are critical
Disadvantage: its systems are bulkier and ~~Jun~~ expensive because RAM ROM and I/o ports are added externally	Disadvantage: the designer can't add any external memory, I/o ports or timers to it to fit more advanced tasks

Q3: Compare between Von-Neuman Vs. Harvard Architecture.

Von-Neaman:

① Single Comman Memory space where Program instructions and data are stored

② there is a single data bus Fetches both instructions and data

Harvard architecture

① Separate Memory area For instractions and another are For data

② one bus Connects the CPU to the RAM and another Connects the CPU to ROM

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Q. By simple way illustrate the types of ROM

1. PROM [Programable ROM]
   - user can burn information into
   - every bit is fuse
   - information can be burned into PROM only once
     So it's called OTP

2. EPROM [Erasable Programable ROM]
   - Programed and erased thousands of time
   - erased by [UV]
   - used is called [UV-EPROM]
   - not possible to erase particular byte of data in EPROM the whole data is ~~deleted~~

3. EEPROM [electrically erasable Programable ROM]
   - erased by electrical signal
   - you can select the byte to be erased
   - it's cost is higher than UV-EPROM

4. Flash memory
   - high density, low cost, non volatile, fast
   - electrically reProgramable

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Q6) By simple way illustrate the types of RAM

[1] SRAM [Static RAM]
- Storage cells are made of flip flops
- it has medium power consumption
- Volatile when the power is lost the data will be lost
- each cell requires at least 6 transistors
- has more complex design

[2] DRAM [Dynamic RAM]
- using capacitor to store data.
- low power consumption
- volatile
- need to refreshing due to charge leakage

[3] NVRAM [non volatile RAM]
- SRAM with battery backup.
- allows the CPU to Read and write to it
- uses internal lithium battery as a backup energy source
- another type combines SRAM and EEPROM

Q6) why Rom is Read only memory though I can write on it?

Rom → CPU doesn't have the capability to write to it
May be written to by an external device such as burner

Q7) Fill the table

Type	Volatile	writeable?	Erase size	Max erase cycle	Cost (per Bit)	Speed
SRAM	Yes	Yes	Byte	unlimited	expensive	Fast
DRAM	Yes	Yes	Byte	unlimited	moderate	moderate
masked Rom	No	No	N/A	N/A	inexpensive	Fast
PRom	No	once	N/A	N/A	moderate	Fast
EPRom	No	Yes	entire chip	limited	moderate	Fast
EEPRom	No	Yes	Byte	limited	expensive	Fast read slow write
Flash	No	Yes	sector	limited	moderate	Fast Read slow write
NVRAM	No	Yes	Byte	unlimited	expensive	Fast

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