Definition

Meaning

Micro-processor : Simply it's an ALU + CU + Registers + Caches on Single IC chip

Microcontroller : it's a CPU with Ram, Rom and I/O port on Single IC chip

Embedded system : any system has MCU to control the system

Mechatronic system : any system Combines between mechanical and electronic devices

n-bit processor : processor works only on n-bit of data at a time

data larger n-bits has to be broken to pieces to be processed

3.

Q2

MCU	MPU
⇒ specific purpose	general purpose
⇒ has Ram, Rom and I/O port	no Ram, Rom and I/O ports
⇒ Cannot add any external Ram, Rom...	System might be expensive Cause we will add Ram, Rom and I/O ports
⇒ Ideal for applications with less cost, time, size	give designer a free choice to decide Ram, Rom, I/O ports

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Q3

Von-Neuman	Harvard
⇒ data and instructions on one memory	two memories one for data and second for instructions
one bus, from cpu to memory	every memory has a special bus, from cpu to memory

Qy

PRom :-
⇒ kind of Rom
⇒ User programmable
⇒ One time programmable (OTP)

EPRoms :-
⇒ kind of Rom
⇒ Can programmed thousands of time and erased program it
⇒ UT device is used for erasing EPROM
⇒ Can't select any byte to delete it

EEPRoms :-
⇒ kind of hybrid
⇒ Can programmed and erased thousands of time
⇒ eras by electrical signal
⇒ Select any byte and delete it

Flash :-
⇒ the updated version of EEPROM
⇒ fast, non volatile, low cost, high density
⇒ Can programmed while it's in system board

Mask Roms :-
⇒ not user programmable, by IC manufacturer
⇒ Cheaper than other kinds of Roms and OTP

Q5

SRAM:-

⇒ Storage cells are made of flip flops and don't require refreshing in order to keep their data

⇒ each cell has 6 transistor

PRAM :-

⇒ 1 transistor and 1 capacitor

⇒ Volatile and fast compare with flash

⇒ need refreshing to keep their data

⇒ Cheaper than SRAM

NVRAM:-

⇒ it's SRAM + Backup Battery or SRAM + EEPROM
when power-off data will copies to EEPROM
and when power turns on data will returned to SRAM from EEPROM

⇒ cpu can read and write data.

Q6

⇒ CPU doesn't have access to write on Rom, but i can write on Rom by external device.

Type	volatile	writable	Erase size	Max Erase size	Cost	Speed
SRAM	yes	yes	byte	unlimited	expensive	fast
DRAM	yes	yes	byte	unlimited	moderate	moderate
Masked Rom	No	No	N/A	N/A	cheap	fast
PROM	No	once	N/A	N/A	moderate	fast
EPROM	No	yes	all chip	limited	moderate	fast
EEPROM	No	yes	byte	limited	expensive	fast to read slow to write
Flash	No	yes	Sector	limited	moderate	fast to read slow to write
NVRAM	No	yes	byte	unlimited	expensive	fast