Unit6 MCU Fundamentals

Lesson 1 Assignment

Assignment Solution

a.)

Definition	Meaning
Micro processor	a single chip which include that can alu, cu, registers to carry out set of instructions and control the execution of execution.
Micro controller	is an mpu in addition to set of other components like ram, rom and other peripherals like I/o peripherals, ... etc
Embedded system	is a computer system but its verification and designed for specific purpose and set of constraints on power, size, time
Mechatronic system	system in which mechanical hw are integrated with micro controllers
n-bit processor	refer to the size of bits which pro cessor read, write, execute, transfer at one clock cycle, data larger than n-bits has been token into pieces

a)

Micro Processor	Micro Controller
a single chip which there an ALU, CU, registers to carry out set of instructs and control the operation of execution	is a MPU in addition to set of other components like RAM, ROM and other peripherals like I/O peripherals, ext peripherals..... etc
designed for general purpose	designed for specific purpose/task
This MPU chip can be not mainly integrated/added with/to other components to build and required MC, SoC to do any purpose	this MCU chip is actually set of MPUs, memory units, peripherals which are designed/ integrated together to perform specific task, but the final MCU chip is not scalable to add other units, peripherals
So it's enable designer to determine the amount of units to be integrated with MPU and the effect of it, it's just a brain which i can put it to operate and both i need (ram both with and size)	But here i can select the both size i need for my task (brain + both) ↓ MCU

q3)

Von - Neumann	Harvard
data & instructions are allocated into the same memory "ram"	there is a separate memory for data "ram" and another for instructions "rom"
There is single common data bus to fetch data & instructions from memory to CPU	There is single data bus among memory data "ram" and CPU & another one among instructions "rom" to CPU

q4)

→ PROM (Programmable ROM):
its program able by the user to burn his own data on it for once the time.

→ EPROM (Erasable Programmable ROM):
its a type of PROM with ability to clear the rom and write on it again to burn data on rom we need a burner.

→ EEPROM (Electrically Erasable Programmable ROM):
its a type of EPROM with ability to clear a specific part of rom instead the whole rom to write new changes on it & no need to an external burner to burn the data on it

→ Flash EPROM:
Data contents are divided into blocks, sector where erasing is done block by another, no need to an external burner to burn the data

→ Mask ROM:
its programmable by only the manufactor to burn his own data once for only one time (blog)

9b)
→ SRAM (Static Random access memory)
- consist of 6 transistors
- there is no need to refresh data contents per time
- Faster, as there is no refresh operations are done
- More complex design
- More expensive
- Used to build Cache Memory

→ DRAM (Dynamic access memory)
- consist of 1 transistor + 1 capacity
- So its less expensive
- less complex
- but the capacity voltage need to be refreshed per time (16 times per second)
- as a result of using refresh operation its slower than SRAM

→ NVRAM (non volatile ram)
- It combines among (SRAM & EPROM) as it make a backup for data per time into [redacted] temporary non volatile memory which has its own battery.

9b)

type	volatile?	writeable?	erase size	max erase cycle	cost	read
SRAM	Y	Y	byte	unlimited	expensive	fast
DRAM	Y	Y	byte	unlimited	moderate	moderate
Masked ROM	N	N	N/A	N/A	inexpensive	fast
PROM	N	once with device programmer	N/A	N/A	moderate	fast
EPROM	N	Yes, with special programmer	entire chip	limited	moderate	fast
EEPROM	N	Y	byte	limited	expensive	fast to read slow to write
Flash	N	Y	sector	limited	moderate	fast to read slow to write
NVRAM	N	Y	byte	unlimited	expensive	fast