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**Question # 1**

**Program Counter:**

It is an address register present in the CPU. It holds the addresses of the instructions that are to be executed. It is also known as “Instruction Pointer” as it points at the instruction.

**Purpose of Program Counter:**

As the CPU receives set of code to be executed, in the fetch cycle the PC sets its value and pointes towards the instruction in the memory to be fetched and then in the execute cycle that instruction is executed and the Program Counter in incremented. Therefore, the purpose of the program counter is to stored address of the instruction and point towards that instruction.

**Question # 2**

**MAR:**

MAR stands for Memory Address Register. It is present in the CPU. It stores the memory address from which the data will be fetched or address where data will be stored. It holds the location of the data that is accessed. It is a very important part because without it all the data will be lost (not accessible).

**MBR:**

MBR stands Memory Buffer Register. It is also known as Memory Data Register MDR. This register is responsible for holding data, which is fetched or stored. MBR stores data on the address given by MAR. It is also a very essential part of the CPU as it is responsible for the data storage.

**Question # 3**

**Interrupts:**

Software mechanism that disturb the running of routine process or other modules.

Interrupts can be generated by User, Some Error Conditions and by Software’s and the hardware’s. But CPU will handle all the Interrupts very carefully because when Interrupts are generated then the CPU must handle all the Interrupts Very carefully means the CPU will also Provide Response to the Various Interrupts those are generated. So that When an interrupt has Occurred then the CPU will handle by using the Fetch, decode and Execute Operations.

**Disable Interrupt:**

This is one of the approach to handle an interrupt. In this the processor ignores all the other interrupts while working on a single interrupt. And when that interrupt is finished then other pending interrupts are looked upon. In this way all the interrupts are handled in a sequence.

**Define Priority Interrupt:**

This is the second approach to handle interrupts. In this low priority, interrupts are interrupted by the high priority interrupts. When a high priority interrupt comes the low priority interrupt is left as it as and high one is processed and as the high one is completed the processor then again starts processing the low one from where it left.

**Question # 4**

Hypothetical microprocessor has 16-bit address and 16-bit data bus.

a. The maximum memory address space that processor can access directly if it is connected to 16-bit memory is 216 = 65536 = 64 Kilobytes because address length consists of 16-bits.

b. The maximum memory address space that processor can access directly if it is connected to 8 bit memory is 64 kilobytes because address length consist of 16 bits. Even though processor is connected to 8-bit, still maximum memory address space remains same as in first part.

Therefore, access of 8-bits will transfer only 8-bits and access of 16-bits will transfer either 8-bits or 16-bits**.**

**Question # 5**

**Bus:**

A communication pathway connects two or more devices and lets them communicate.

**Dedicated Bus:**

It is also known as Unibus. In this type of bus there is separate bus for each type of load. There is separate bus for data, separate bus for addresses and separate bus for control signal.

In this type it is less complex, more efficient, more costly and it takes more space as no. of busses increases.

**Multiplexed Bus:**

In this type of bus there is single bus for all the load. A single bus handles movement of data, addresses and control signals.

In this type it is more complex, less efficient as compared to dedicated bus, less costly, it takes less space and propagation delays also occur.