1. List out the Semi Conductor products and it's corresponding companies.

Ans: The semiconductor industry is vast and diverse, encompassing a wide range of products and companies. Here are a list of some major semiconductor products and their corresponding companies:

Category	Product	Companies
Memory	DRAM	Samsung, SK Hynix, Micron Technology
	SRAM	Cypress Semiconductor, Fujitsu, Renesas Electronics
	Flash Memory	Samsung, SK Hynix, Micron Technology, Intel, Toshiba
	EEPROM/EPROM	Microchip Technology, NXP Semi-conductors, ST Microelectronics
Microprocessor and Microcontrollers	x86 CPUs	Intel, AMD
	ARM CPUs	Apple, Qualcomm, MediaTek, Samsung
	Microcontrollers	Microchip Technology, NXP Semi-conductors, Renesas Electronics, ST Microelectronics
Logic Devices	FPGAs	Xilinx, Intel, Lattice Semiconductor
	CPLDs	Altera, Lattice Semiconductor

	ASICs	Synopsys, Cadence Design Systems, Mentor Graphics
Analog and Mixed-Signal Devices	ADCs	Texas Instruments, Analog Devices, Maxim Integrated
	DACs	Analog Devices, Texas Instruments, Maxim Integrated
	PMICs	Texas Instruments, Analog Devices, Maxim Integrated
	Sensors	Bosch Sensortec, ST Microelectronics, Infineon Technologies
	Audio ICs	Cirrus Logic, RealTek Semiconductor, Analog Devices
RF and Wireless Devices	RF Transcievers	Skyworks Solutions, Qorvo, Boardcom
	Wifi/Bluetooth ICs	Broadcom, Qualcomm, Texas Instruments
	Cellular Modems	Qualcomm, MediaTek, Hisilicon
	GPS/GNSS Receivers	Broadcom, Qualcom, U-blox

2. What are the latest laptop processors from AMD, Intel and Apple: Frequency and Node.

Ans:

AMD

The latest processor is Ryzen 9 7000 series

1. AMD Ryzen™ 9 7945HX

Base clock : 2.5 GHz

Max Boost clock : upto 5.4 GHz

Frequency : 2200 MHz (Graphics)

node : 5nm FinFET

2. AMD Ryzen™ 9 7950X3D

Base clock : 4.2 GHz

Max Boost clock : upto 5.7 GHz

Frequency : 2200 MHz (Graphics)

node : TSMC 5nm FinFET

Intel

The latest processor is Intel® Core™ i9 Processor 14900 series

1. Intel® Core™ i9 processor 14900K

Base Frequency : 2.4 GHz

Max Turbo Frequency : 6 GHz

node: 10nm Enhanced SuperFin

2. Intel® Core™ i9 Processor 14900KF

Same as 14900K expect no graphics card.

Apple

The latest processor is M3 Max and M3 Pro Series.

1. M3 Max

Frequency: 4.4 GHz

Max Turbo Frequency : 4.6 GHz

node : 3nm GAAFET

2. M3 pro

Base frequency : 4.2 GHz

Max Turbo frequency : 4.4 GHz

node : 3nm GAAFET

3. What are the latest mobile processors available from Qualcomm and mediatek: Frequency and node

Ans:

Qualcomm

The latest processor is Snapdragon 8 Gen 3

clock speed : 3.3 GHz

Frequency boost : NA

node : 4nm FinFet (TSMC)

Mediatek

The latest processors is MediaTek Dimensity 9300

1. Arm Cortex - X4

clock Speed - upto 3.25 GHz

Frequency boost - NA

node - 4nm FinFet (TSMC)

2. Arm cortex - A720

clock Speed : upto 2.0 GHz

Frequency boost : NA

node - 4nm FinFet (TSMC)

4. What are the different job roles available in vlsi field.

Ans: The different job roles available in VLSI field are

1. VLSI Design Engineer
2. RTL Design Engineer
3. ASIC Design Engineer
4. FPGA Design Engineer
5. Digital Logic Design Engineer
6. DFT Engineer
7. Physical Design Engineer
8. Verification Engineer
9. IP Design Engineer
10. Library Developer
11. EDA/CAD Engineer
12. Process Integration Engineer
13. Application Engineer
14. Test Engineer
15. Technical Engineer
16. Analog Design Engineer
17. Analog Layout Engineer
18. AMS Engineer
19. Memory Design Engineer
20. STA Engineer
21. SoC Architect

5. Why there is a shift from BJT - MOSFET - FINFET in detail.

Ans: The evolution of transistors has been a fascinating journey, driven by the relentless pursuit of smaller, faster and more efficient devices. This journey has witnessed a shift from bipolar junction transistors (BJTs) to metal-oxide-semiconductor field-effect transistors (MOSFETs) and more recently, to FinFETs. Each transition was motivated by the need to overcome limitations and achieve better performance.

The Rise of MOSFETs:

BJTs dominated the early days of transistor technology. However, they faced limitations with scaling. As transistors were shrunk, short-channel effects became more pronounced, leading to increased leakage current and reduced performance. Additionally, BJTs required relatively complex current-driven circuits, making them less suitable for high-density integrated circuits.

MOSFETs emerged as a more scalable solution. They offered several advatages over BJTs such as voltage controlled operation, Higher switching speed, Lower power consumption and smaller size. These advantages led to the widespread adoption of MOSFETs in digital circuits, memory devices and other applications.

The Need for FinFETs:

Despite the advantages of MOSFETs, their performance started to suffer as transistor size approached the limits of conventional scaling. short-channel effects became even more pronounced, causing leakage current to increase and agate control to weaken.

To overcome these limitations, FinFETs were introduced. FinFETs are essentially 3D MOSFETs, where the channel is formed on a thin fin instead of a flat surface. This fin structure offer several advantages: such as Improved electrostic control, superior scalability and higher density.

6. Explain about Evolution of Memory Technology.

Ans: The Evolution of memory technology is as follows:

Early Days

- Magnetic Core Memory (1950s)

The dominant memory technology for over two decades, magnetic core memory relied on tiny, donut shaped rings to store data. while reliable and durable, it was expensive, bulky & slow.

- Drum Memory

The technology used a rotating cylinder coated with magnetic material to store data. It was faster and cheaper than core memory., but lacked speed and capacity.

- Williams Kilburn Tube

The first high-speed, all electronic memory, stores data on surface of cathode ray tube. It was fast and efficient but required constant refreshing.

Rise of Semiconductor Memory

- MOS Memory

The invention of MOS transistor revolutionized memory technology. MOS memory was smaller, faster and cheaper than its predecessor paving the way for modern memory chips.

- SRAM

SRAM is a fast and reliable form of memory that retains data as long as power is supplied. It is used in applications requiring high speed and low latency such as caches.

- DRAM (Dynamic Random Access Memory)

It is a high density form of memory that uses capacitors to store data. It requires constant refreshing but offers significant higher capacity than SRAM at a lower cost. It became the dominant form of RAM for personal computers and other devices.

Modern Advancements

- Flash Memory

It is a non volatile storage medium that retains data even without power. It is used in USBs, SSDs & Smart phones.

- MRAM (Magnetoresistive RAM)

It is a type of non volatile memory that uses magnetic fields to store data. It offers high speed, low power consumption and long endurance.

- RRAM (Resistive RAM)

It is a type of non volatile memory that uses the resistance of a material to store data. It is fast, energy efficient & scalable.

- PCM (Phase change Memory)

PCM uses the phase change of a material to store data. It offers high speed, low power consumption and excellent endurance.