A) list out the semiconductor products & its corresponding company

→ Product : Microprocessor

CPUs for desktop
laptops
server & mobiles etc.

companies: Intel, AMD, ARM, Qualcomm, Apple, Nivida

→ Product : Memory (DRAM, NAND flash memory)

company : Samsung, ~~Mt~~ micron technology, Toshiba, western digital logic chips

→ Product : micro controller, FPGA, RF chips, CPU

company : TSMC, Samsung family, Intel, AMD, Analog semi

→ Product : ampifier, voltage regulator, power management IC

company : TI, analog devices, max in Integrated products discrete etc.

→ Product : Power semiconductor, diode, transistors, resistors, capacitor & inductor

company : Infineon technology

→ TSMC : TSMC is world largest foundary, manufacture chips for other companies. its major supplies for Apple, NIVIDIA & Qualcomm.

Products :- Image sensors, temperature sensors, accelerance gyroscopes.

Company :- Sonoy, Samsung, Bosch, NXP, ST Microelectronics

Products :- Power electronics, involve MOSFETS,

Company :- Infineon. teechology, ON semiconductor, Fuji electric

Products :- RF components involve RF switches filters, mixes, oscillator

Company :- NXP, Broadcomm, & QRVO

→ Product :- Optical components : LED's Lases, photo detector optical amplifiers, optical modulators.

Company :- Samsung, LG innotek, Broadcom, OSram

Products from specific composer

→ AMD :- they manufacture up. products widely use of semiconductor products including graphic, FPGA & logic chips

→ Intel :- inter is a leading manufoture of up, memory, logic chips

Why there is a shift from BJT to MOSFET?

Ans: Current technology nodes of

BJT : 22nm

MOSFET : 7nm

FINFET : 5nm

As you can see there is a degradation of transistors manufacturing in a chip from BJT to MOSFET & MOSFET to FINFET.

→ BJT to MOSFET:

Power efficency: ~~Here~~ MOSFETs gained prominance over BJT due to their superior power efficency & scalability.

→ MOSFETs operate on the principal of voltage control, offering high i/p impedence, low power consumption over BJT

→ MOSFETs are smaller size and also have faster switching speeds, making them suitable for high frequency application

→ CMOS technologies:

which begins model integrated ckts, offers low power consumption and also digital logic ckt design.

MOSFET to FINFET

→ scaling limitations: MOSFETs were scaled down to smaller sizes, they faces challenges to short-channel effect increasing leakage current.

→ finfet features a 3-dimensional of fin-like structure for the channel, offering better control over the channel.

→ finfet provide superior control, reduce leakage power and better scalability

What are the latest laptop processor from AMD, intel & Apple: freq & node?

→ AMD

- AMD Ryzen 9 7000 series.

  clock freq: 4.2 GHz (Base clock)

  technology node: TSMC 5nm FINFET.

  Max clock freq: upto 5.7GHz

→ AMD Ryzen 9 7945HX3D:

  Base clock = 3.7GHz

  Max. Boost clock: upto 5.4GHz

  technology node: TSMC 5nm FINFET

Intel:

Intel core i9 14th generation:

freq : upto 6.0 GHz

Processor family: Meteor Lake

Technology node: 5nm processor node

Apple:

① M2_pro & M2_Max

M2 Pro:

freq : upto 3.49 GHz

Node: 5nm

M2 Max:

freq = 3.54 GHz

Node : 5nm

4) what are different jobs available in VLSI

RTL engineer
Verification engineer
DFT
STA engineer
Physical design
layout engineer
analog design
digital design
IP design
SOC
FPGA engineer

5) evolution of RAM memories