Tech Assignment.

① techniques to avoid dynamic power.

↳ Here are some techniques to minimize it.

① clock Gating :- disabling the clock signals to inactive parts of the circuit.

② voltage Scaling :- Lowering the supply voltages reduces the energy consumed during each switching event.

③ Multi-Vdd :- Using differently supply voltages for different parts of the ckt based on their activity levels.

④ sizing optimization

⑤ logic optimization

⑥ Data reuse

② why Double via Insertion?

→ it is used to improve signal integrity and reduce noise.

- it reduces the Resistance. and provides low resistance Path.
- Improved noise immunity :- be reducing crosstalk b/w adjacent signals.
- Better electromigration (EM) Resistance :- Double vias can distribute current more evenly, reducing the risk of electro migration failure.

③ what is CMP

CMP stands for chemical mechanical polishing. it is a planarization technique used in semiconductor manufacturing to precisely remove material from the wafer surface. CMP is crucial for achieving the smooth, flat surfaces required for modern integrated circuits.

6. EM fixing methods.

electromigration is gradual movement of metal atoms within a conductor due to the flow of current. EM can lead to open circuits and device failure.

some methods for fixing.

1. widening metal lines
2. Double or triple metal layers
3. via spacing
4. Buffer insertion.

(7) what is MCMM in physical Design.

MCMM stands for multi corner - multimode. it is used to ensure that the design meets timing requirements across different operating conditions and modes.

MCMM analysis helps to identify and fix timing violations that may occur under different operating conditions, ensuring the reliability and robustness of the design.

(3).

FinFET	MOSFET
(1) 3D structure with vertical fins.	(1) planar 2D structure.
(2) Gate wraps around three sides of the fin. providing better control over the chain	(2) Gate lies on top of the channel leading to weaker control at dimensions
(3) significantly lower leakage current.	(3) Higher power consumption
(4) Lower Power consumption	(4) Slower switching speeds.

(5). NDR stands for Non-Default rules in PD. NDR's are special rules that are applied to reduced cross-talk. electromigration, congestion, and timing problems.

- Reducing cross-talk.
- Reducing electro migration.
- Avoid congestion.