Department of Electrical Engineering

Assignment

Date: 20/04/2020

Course Details

Course Title: V.L.S.I Module: _____

Instructor: Engr. Zulqarnain Total Marks: _____

Student Details

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Part A (Objective Type)

1. In CMOS circuits, which type of power dissipation occurs due to switching of transient current and charging & discharging of load capacitance??
   a. Static dissipation
   b. Dynamic dissipation
   c. Both a and b
   d. None of the above.

2. Which type of MOSFETS Exhibits no current at zero gate voltage?
   a. Depletion MOSFET
   b. Enhancement MOSFET
   c. Both a and b
   d. None of the above

3. CMOS circuits are constructed in such a way that all PMOS transistors must have either an input from the voltage source or from another
   a. PMOS transistor
   b. NMOS transistor
   c. CMOS transistor
   d. BJT transistor

4. Delay which is equal to the time taken by a gate output transition to 0, from another value 1, x, or z is
   a. Rise delay
   b. Fall delay
   c. Turn-off delay
   d. Turn-on delay

5. Which type of simulation model is used to check the timming performance of a design?
   a. Transistor level
   b. Gate level

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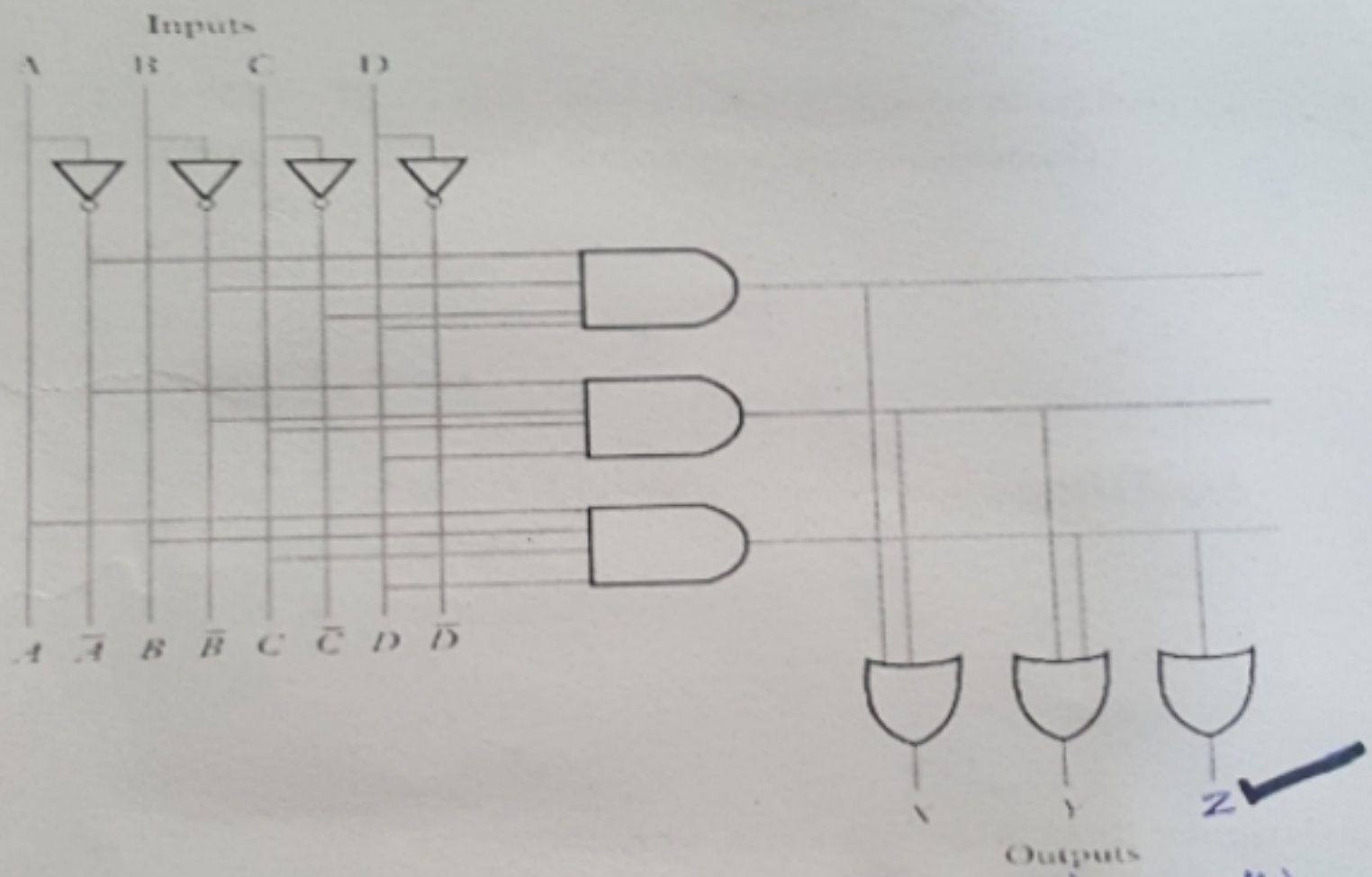
c. Behavioral
d. Switch level
e. None of these

6. Which of the following statements is incorrect
a. Some PLDs are programmed using electrically operated switches.
b. Some PLDs are programmed using mechanical switches

Fill in the Blanks

7. In MOS devices, the current at any instant of time is Constant & independent of the voltage across their terminals.
8. For complex gate design in CMOS, OR function needs to be implemented by connections of MOS → Pavalled
9. In the following PLA, which output implements the logic function ABCD??



10. The term VLSI means a device containing between Thousand and Million transistors.

Part B (Subjective Type)

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Q1.		In low power VLSI design clock gating technique will reduce power all time or it depends upon the input date? Is any chance, the computation power may increase? (5)
Q2.	(a)	If we want to design an IC and I want that each and every transistor used in this IC should be optimized individually with less time. How it will be possible?? (5)
	(b)	While fabrication of NMOS or PMOS we usually use inorganic polymer. If we use organic polymer instead of inorganic polymer what will happen?? (5)
Q3.		Draw a stick diagram of a layout using that variable ordering (5) $F = \overline{ACD + ABD}$

Q 01 (01) Ans

Clock Equating Technique :

The clock equating technique using the flip-flop clock only when the out-put has to change. clearly its mean that How will clock less the circuit that in the precious one.

* In vealify when this is done via the Synthesis Tool vather when Just one and a latch integrated call in the laibovary used and the present alitch is used with the ~~end~~ timming of the clock and enable are different clock-tree synthesis. these are ~~main~~ may also be added observably to different veason. clearly a ouating structure would not be applied to every register. The cost power in the vating would ateed Saving on a flop.

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Q 02 (A)

(Ans)

02 (A) A Transistor is a semiconductor device used to amplify or Switched electronic signals and electrical Power. it is composed of semiconductor material usually with at least three terminals for connection an external circuit. A voltage or Circuit applied to one pair of the transistor terminal controll the current through another pair of terminal. B-C the controll (out-put) power can be ~~heig~~ higher than the controlling (input) power a transistor can simplify.

* Today some transistor are packed individually but many more are found embeded in integrated circuit.
* The more transistor are in Circuit faster and data processed.

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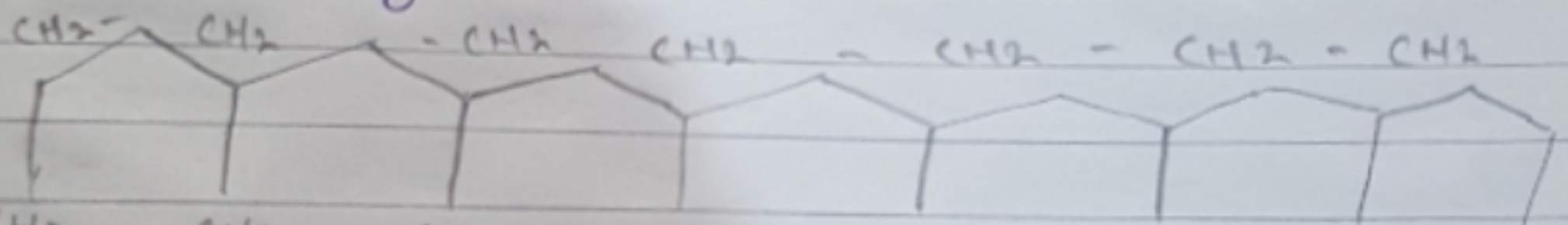
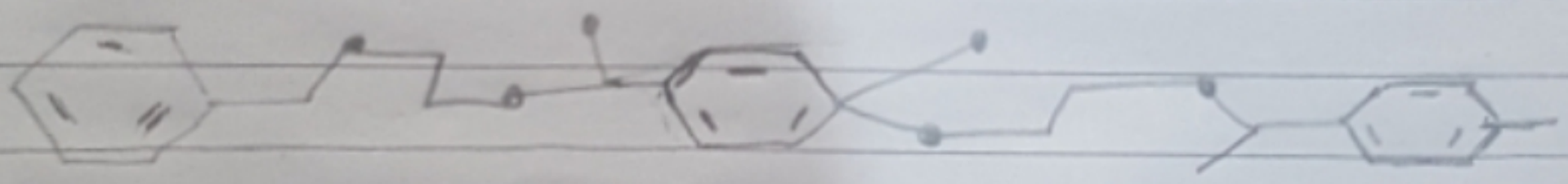
Q02 (B1)

Ans (B)

Organic Polymers

Organic polymers that essentially are polyme material contain carbon atoms in the backbone. therefore there are only carbon covalent bond. in these polymer only from organic monomers molecules. most of the times, these polymers are environmental friendly since are biodegradble.





* Further more there are two major forms of organic polymers such as natural and Synthetic polymers common. Exampe of important organic Polymers.
(Polyeride proteins, Polynchlorides. (DNA & RNA). ka

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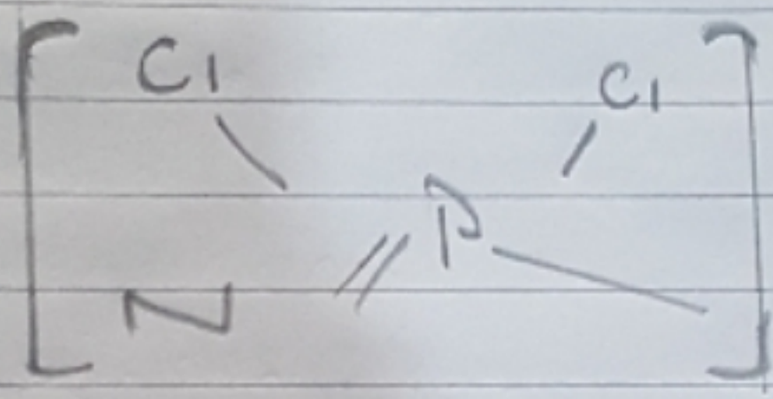
Inorganic Polymers Material
that have no carbon atoms.
in the back-bone. However
most of these are some
organic regions as well.
materiable are highley branched
structures and have chemical
element other than Carbon.



These polymers are not environmentally
friendly. B.C they are not
biodegradbly.

C.x. Include polydimetriesiltan is
(Silicon, rubber,) polyphosphazens e.t.c.

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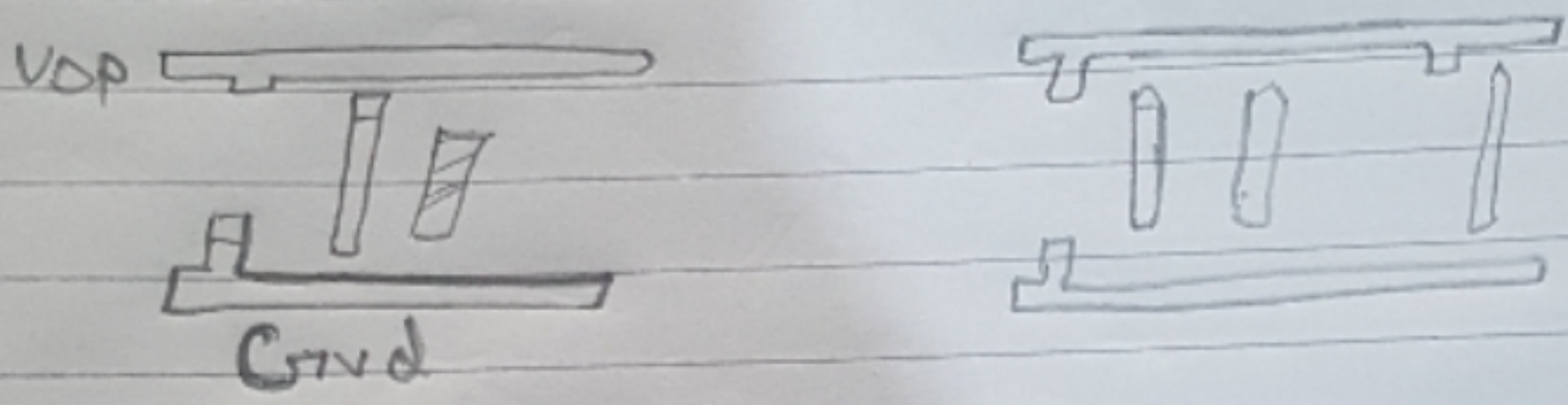
Ans(03) **Stick diagram:**

Stick diagram help plan layout quickly.

- Need not be to scale.
- Draw with colour pencil or dry marker.



* **Wiring Tracks:**

A wiring tracks is the space required for a wire in with 4x spacing from neighbor = 8λ pitch.

→ Transistor also cosume one vstoy track.

* **Well Spacing:** we must surround transistor by 6λ implies 12λ b/w opposite transistor flavors.
- Leaves room for one wire track.

* **Area Estimation:** Estimation area by counting wires tracks
- Multiple by 8 to express in λ