Date:

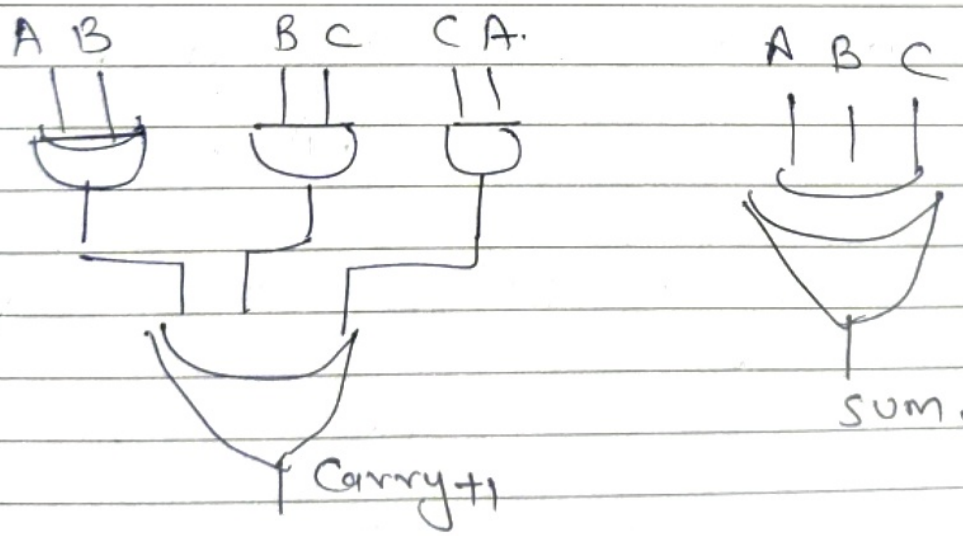
9. 4 bit ripple carry adder.

Each full Adder is implemented using a 3input xor gate, 3 2input AND gate and one 3 input OR gate.

3input xor gate delay – 3 nsec.
2input And gate = 1 nsec.
3 input or gate – 1 sec.

Total time taken to perform addition?

Ans.



for one full Adder, Prop. time

$= \max.(\text{xor gate}, \text{AND}, \text{OR})$

$= \max(3, 1, 1) = 3$ nsec.

Total Prop. time for 4 full Adder

$= 4 \times 3 = 12$ nsec.

Page No
Date
YOUVA

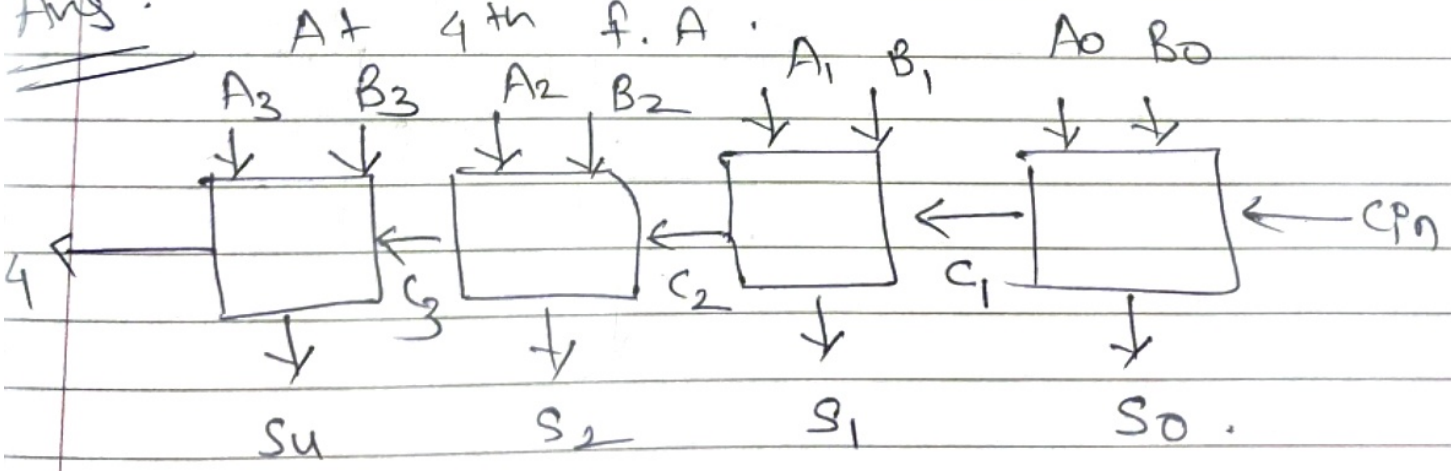
Q. 4 bit ripple carry adder.

Prop. time = XOR 20 ns
AND 15 ns
OR. 10 nse.

time taken for carry out at 4th f.A.

time taken for sum perform.

Ans: At 4th f.A.



Carry-4 $\Rightarrow$ 4 x Carry time.

Carry time = Xor + And + or.

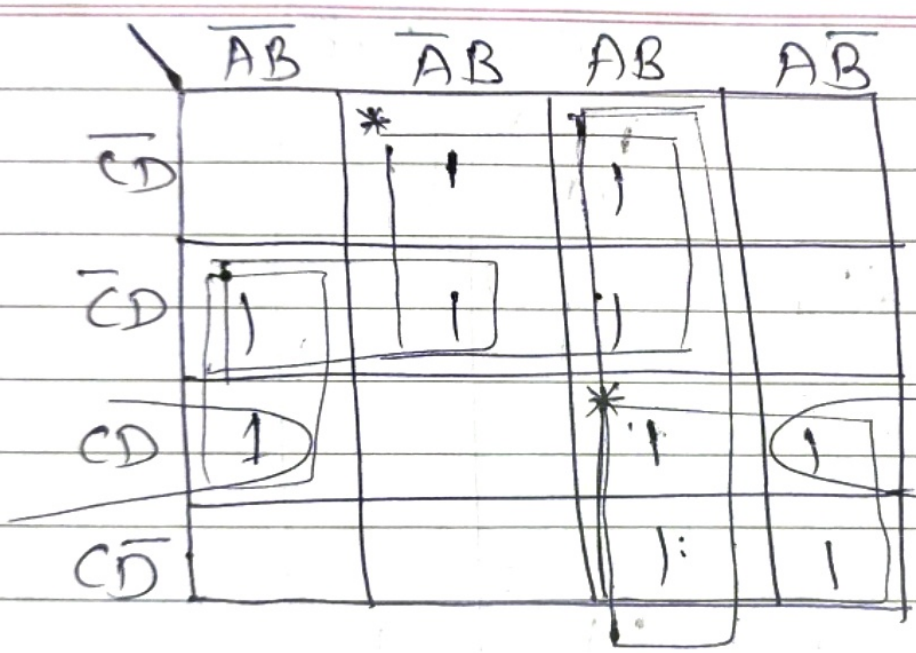
= 20 + 15 + 10 = 45 nsec.

Carry 4 = 4 x 45.

Sum 4 = 3 x Carry time + S_4 time

= 3 x 45 + (20 + 20)

= 40 + 135

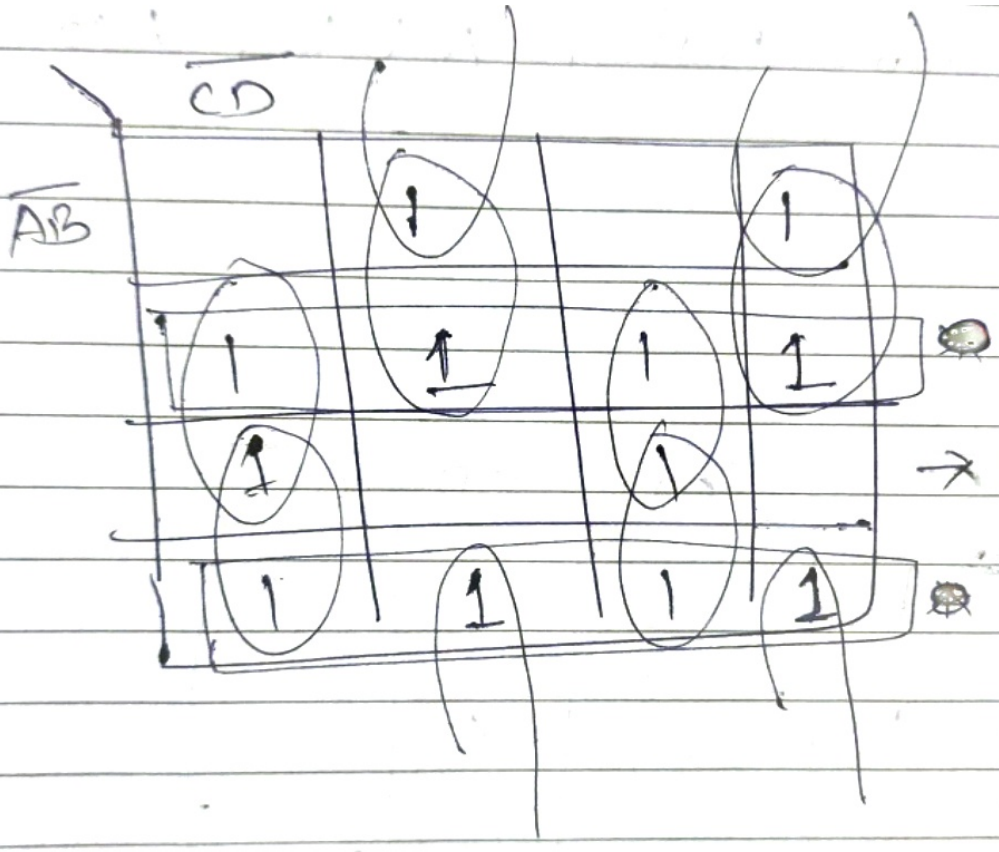


EPI = 2.

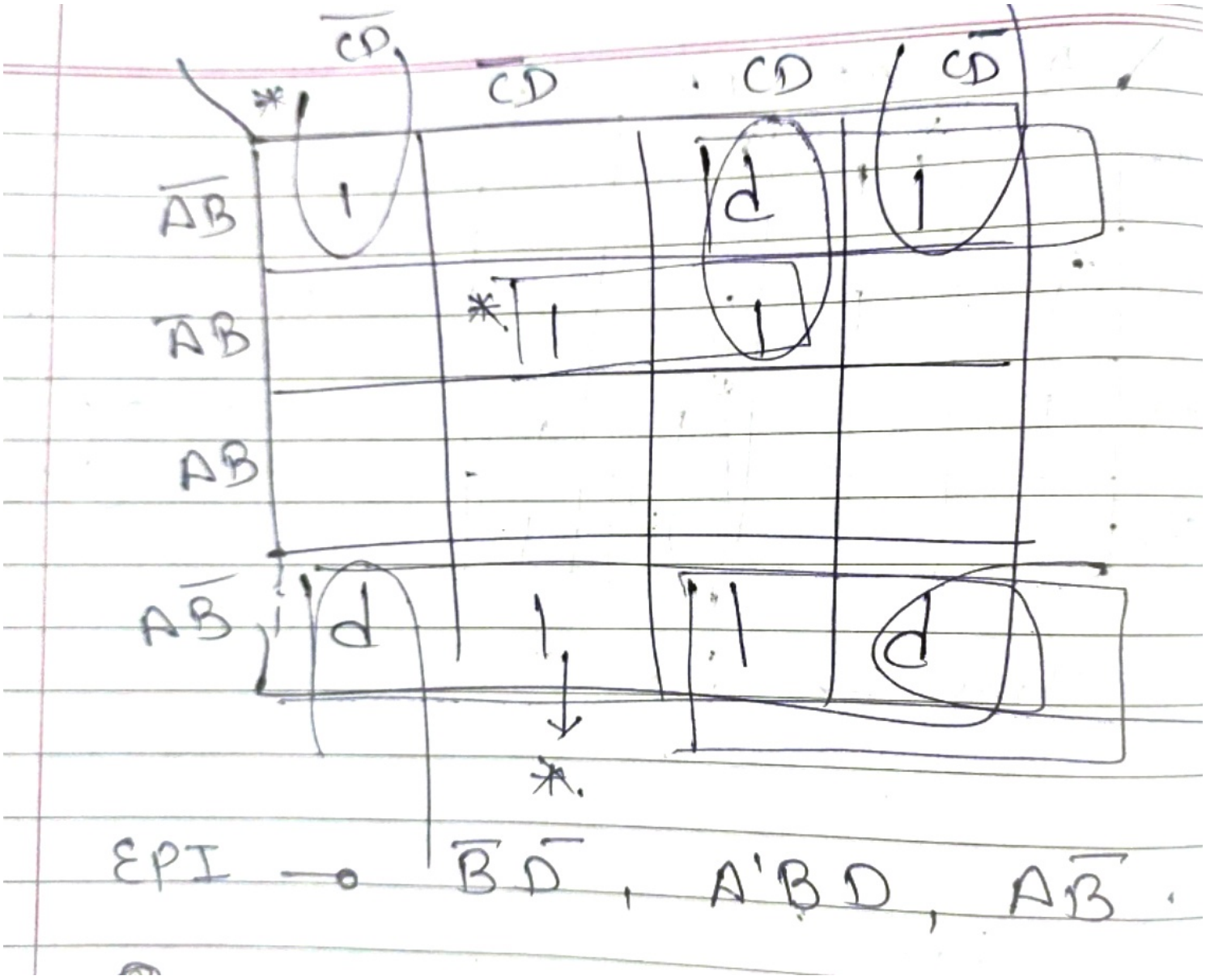
① CA

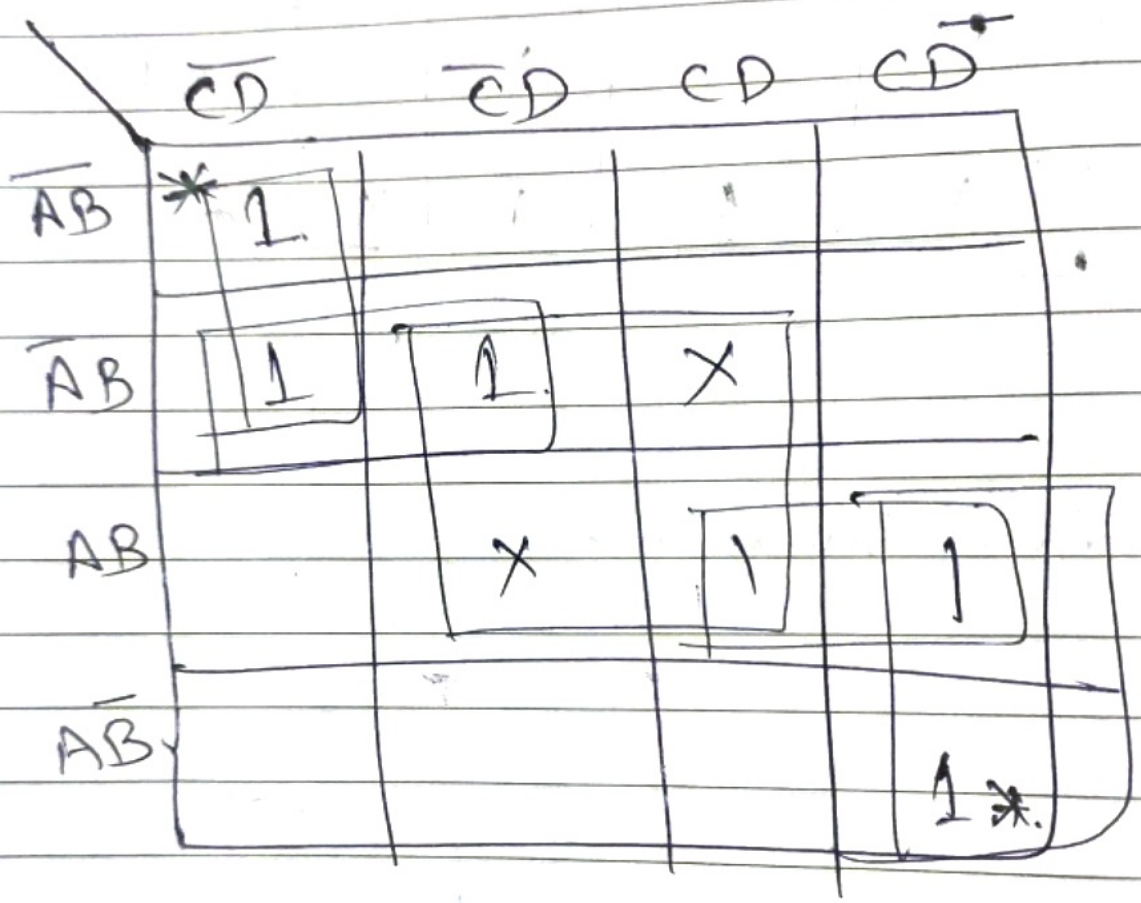
② $\overline{C}B$.

Prime Imp → 6



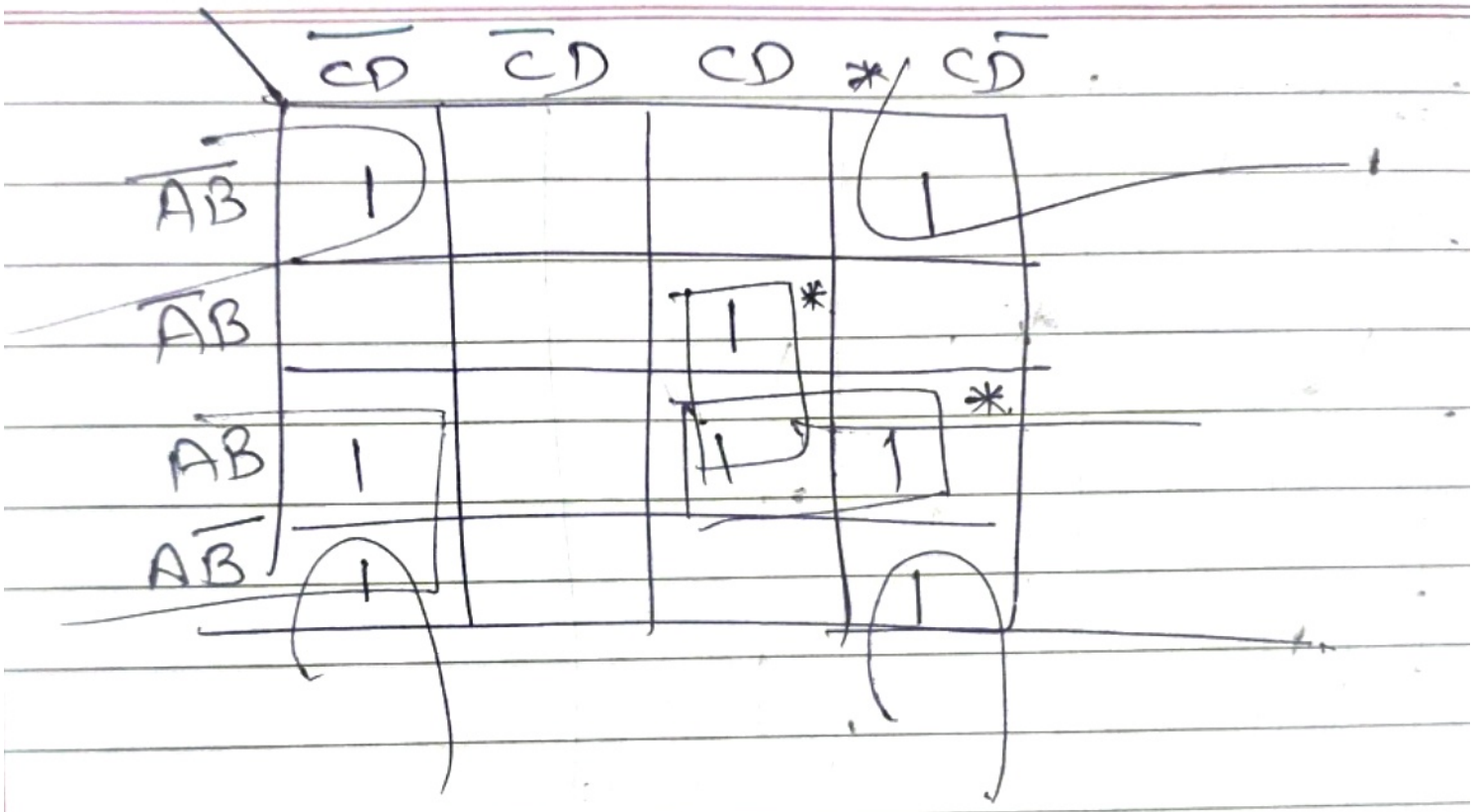
Prime Imp →


$\overline{CD}$
CD
CD
$C\overline{D}$
$\overline{AB}$
$\overline{A}B$
AB
$A\overline{B}$
EPI → $\overline{B}\,\overline{D}$, $A'BD$, $A\overline{B}$.



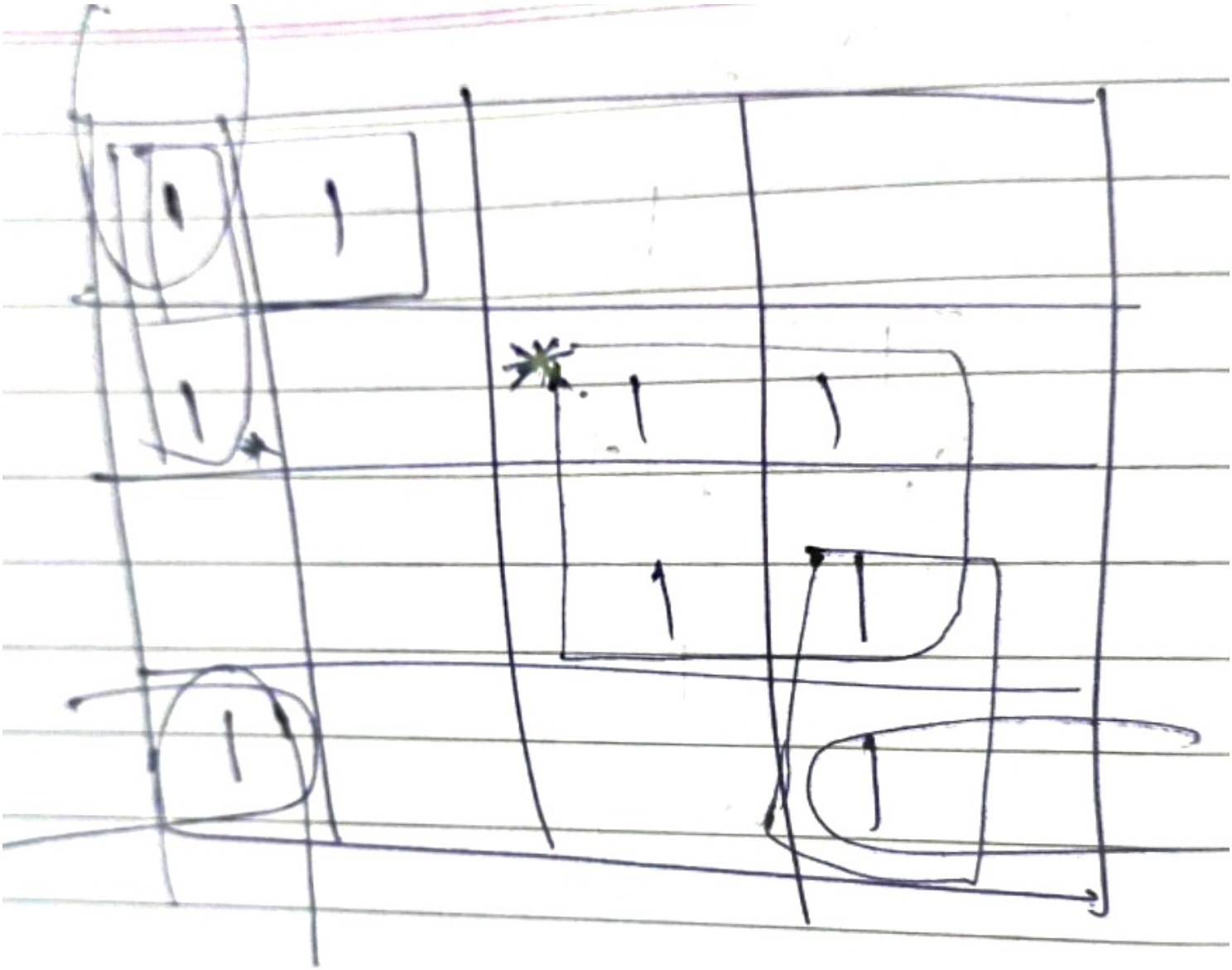
2 EPI → $\bar{A}C\bar{D}$, $AC\bar{D}$.

PI = 5.



3 EPI — $\overline{BD}$, $A\overline{D}$, $B\overline{C}D$

PI → 4.



EPI → 2 : 1

PI →