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1- A

wafer area = 3.142×8^2 = 201.088 cm^2 ⇒ wafer _ x
$\pi \cdot r^2$

dies per wafer ≅ wafer area / die area

64 = 201,088 / die area
die area = 3.142

wafer area = πr^2 = $3,142 \times 10^2$ = 314.2 cm^2
$\pi \quad r^2$

100 = 316.2 / die area
die area = 3.142

1- B

wafer_x = $1/(1+ \text{defects per area} \times \text{die area}))^2$

$1/1+(0.02 \times 3.142/2))^2$ yield = $\frac{1}{1.084}$ = 0.94

cost per die = $\frac{15}{64} \cdot 0.94$ = 0,2493

wafer_y = $1/1+(0.03 \times 3.142/(2))^2$ yield = 1/1.096 = 0.9124

cost per die = $\frac{24}{100} \cdot 0.9124$ = 0.26

1- C

wafer _ x = 15 % 20 = 3 cost per wafer = 15 - 3 = 12

64 % 10 = 6.4 dies per wafer = 70.4

0.02 % 15 = 2.003 + 0.02 = 0.023 = defects / cm^2

wafer -y = 24 % 20 = 4.8 cost per wafer = 19.2

100 % 10 = 10 dies per wafer = 110

0.03 % 15 = 0.0045 + 0.03 = 0.0345 defects / cm^2

70.4 = 201.088 / die area = 2.8563 die area for wafer _x
110 = 314.2 / die area = 2.8563 die area for wafer -y
> A

yield, for wafer_x $= 1/(1+(0.023 \times 2.8563/2))^2 = 0.9374$

cost per die for wafer_x $= 12/70.4 \times 0.9374 = 0.1818$

yield for wafer_y $= 1/(1+(0.0345 \times 2.8563/2))^2 = 0.9083$

cost per die for wafer_y $= 19.2/110 \times 0.9083 - 0.1921$

1.B

→ for wafer_x cost per die 0.2413 in previous year, so cost per die has decreased compared to previous year. So, 0.1818 for this year.

→ for wafer_y cost per die 0.26 in previous year. So, cost per die has decreased to 0.1921

2-A $P1 = 10^9 \cdot (0.3) \cdot 2 + 10^9 (0.5) \cdot 4 + 10^9 \cdot (0.2) \cdot 3 = 32 \cdot 10^8$

$P_2 = 10^9 \cdot (0.3) \cdot 3 + 10^9 \cdot (0.5) \cdot 3 + 10^9 \cdot (0.2) \cdot 3 = 30 \cdot 10^8$

2-B $P_1 = 32 \cdot 10^8 / 10^9 = 3{,}2$

$P_2 = 30 \cdot 10^8 / 10^9 = 3$

(clock cycles / instructions)

2-C $P_1 = 32 \cdot 10^8 / 3 \cdot 10^9 = 1.06$

$P_2 = 30 \cdot 10^8 / 1.5 \cdot 10^9 = 2$

clock cycles / clock rate

2-D execution time P1 / execution time P_2 = performance P_2 / performance P_1

$\frac{2}{1.06} = 1.89$ → P1 is faster than P_2 1.9 times