Midterm 2021 ans

[1] on adding (n-bit) 2 num
the result will @ most
need -----

ans
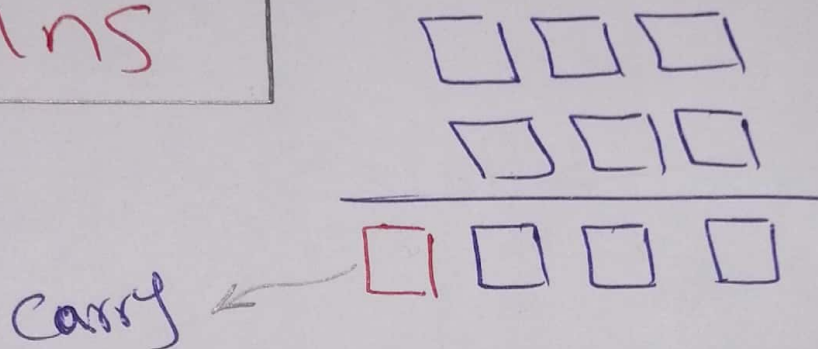
carry ←

لكي لا يبقى أكثر حاجة (n+1) bit او carry يكون فيه محكم

[2] 2's comp of $(01101)_2 = \ldots$

ans

نزيد لكل أول واحد واخلي واحد والى على اللي ورا

$(10011)_2$

| 3 | $(19)_{12} = (\text{---})_{2}$ بتحويل |

ans

$$(19)_{12}^{\overset{12^1\ 12^0}{}} = 1*12^1 + 9*12^0$$

$$= (21)_{10}$$

$(101 01)_{2}$ ← نحولهم

لل $(--)_{2}$ بقى فقط

| 4 | $(5.2)_{10} \longrightarrow BCD$ |

ans

$$(5.2)_{10}$$

$$(0101 \cdot 0010)_{BCD}$$

لنحول كل رقم لوحده كباينري

5

$$(571202)_8 = (\text{----})_{16}$$

الحجم مختلف وحوله

كل ال Dec او بالعكس

$$\overset{8^5\ 8^4\ 8^3\ 8^2\ 8^1\ 8^0}{(571202)_8} = (193154)_{10}$$

$$(2F282)_{16} \xleftarrow{} 16$$

6

to count from 0 to $(99)_{10}$ you need ----bits

range : $0 \longrightarrow 2^n - 1$

$$2^n - 1 = 99$$

$$\boxed{n = 7}$$ آقل n تكفي

7) the Primary advantage
of BCD instead of bin

ans the relative ease of
converting to and from decimal

8) $(01110010)_2 - (01001001)_2$

ans

$$01110010$$
$$2's \underline{(01001001)^+}$$
$$\overline{01110010} +$$
$$\underline{10110111} +$$
$$\overline{100101001}$$

Carry

$X \rightarrow +ve$ ∴ result $(00101001)_2$

9) What is the base required to make $13 + 3 = 20$ correct ? $\left[2 - 3 - 4 - \text{Non} \right]$

ans $(13)_2 + (3)_2 = $ مستحيل

أعلى أو كشاب ~ أمرك ونفس (1, 0)

ونفس الكلام في 3

$(13)_4 + (3)_4 = (10)_{10} = (22)_4$

(in correct)

None يبقي

10) $AB(\overline{\overline{A} + \overline{B}}) = \cdots$

ans $AB(AB) = AB$

$\square \, . \, \square = \square$

11) $AB(\bar{A}+\bar{B}) = -\sim$

$A\bar{A}B + AB\bar{B} = 0$

$\underset{0}{\swarrow} \qquad \underset{0}{\swarrow}$

12) $X+YZ$ is reduced

from $\begin{bmatrix} X+YZ & XY+YZ & X+YZ & - \text{all} \\ +XZ & +X\bar{Y} & +\bar{X}YZ \end{bmatrix}$

ans

$X + XZ + YZ = X(1+Z)$
$\qquad\qquad\qquad\qquad + YZ$
$\qquad\qquad\quad = X+YZ$

$XY + X\bar{Y} + YZ = X(Y+\bar{Y}) + YZ = X+YZ$

$X + YZ + \bar{X}YZ = X + YZ(1+\bar{X})$
$\qquad\qquad\qquad = X+YZ$

$\overparen{\text{all are correct}}$

13 Comp of $\bar{x}y + z\bar{w}$

$$\overline{(\bar{x}y + z\bar{w})} = (\overline{\bar{x}y})(\overline{z\bar{w}})$$

$$= (x + \bar{y})(\bar{z} + w)$$

14 2-input XOR gate

is called $--$ $--$ (Comparator)

15 5 input XOR gate is Called

$\underline{\quad\quad}$ (odd Parity detector)

x	y	
0	0	0
0	1	1
0	1	1
1	0	1
1	1	0

(Comparator)

x	y	z	
0	0	0	0
0	0	1	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0

(odd Parity)

16) 2-input XOR gate
with one input always high
can act as ----

ans

$$X\bar{Y} + \bar{X}Y = X(0) + \bar{X}(1)$$
$$= \bar{X}$$

يبقى ←
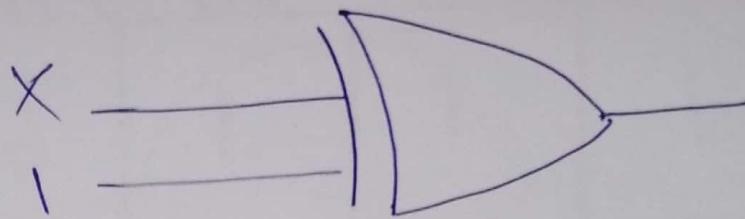
inverter

17) " " with Low

can act as

ans
$$X\bar{Y} + \bar{X}Y = X(1) + \bar{X}(0) = X$$

← يِبقى بيتطلع زي ما طلع
(buffer)

(18) max no gates $\longrightarrow$ fan out

(19) $F(A, B, CD) = \sum (0, 2, 4, 6, 8, 10, 12, 14)$

ans

CD\AB	00	01	11	10
00	1	1	1	1
10	1	1	1	1
11				
01				

$F = \bar{D}$

20) Find no of Product terms without Simplification.

$$F = \sum(0, 1, 2, 3, 8, 9, 10, 12, 13, 14, 15)$$

ans

CD \ AB	00	10	11	01
00	1	1	1	
10	1	1	1	
11	1		1	
01	1	1	1	

$$F = \bar{A}\bar{B} + AB + A\bar{D} + A\bar{C}$$

ans (4)   4 terms

21 --- product terms

without simplification

$$F = \sum (0, 1, 4, 5, 9, 11, 13, 15)$$

ans

CD\AB	00	10	11	01
00	1			1
10				
11		1	1	
01	1	1	1	1

كل ١ مش أبسط صورة

$$F = \bar{A}\bar{C} + AD$$

ans (2)

22) What is the min
no of gates to represent
$\overline{X} + \overline{y} + \overline{z}$ after simplifact.

ans

$$\overline{X} + \overline{y} + \overline{z} = \overline{(X \; y \; z)}$$

X
y
z

f

(1 gate)

وظيفة and
يعين NAND
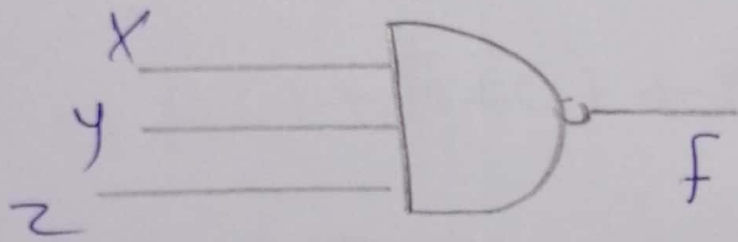
23) $F = \sum(0, 1, 2, 3)$ will result
in ---- Product terms

$$F = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}CD$$

(4 terms)

24 Simplify and say no
of gates

$$AB + A(A+C) + B(A+C)$$

ans

$$AB + A + AC + AB + BC$$

$$= AB + A + AC + BC$$

$$= A(1 + B + C) + BC$$

$$= A + BC$$
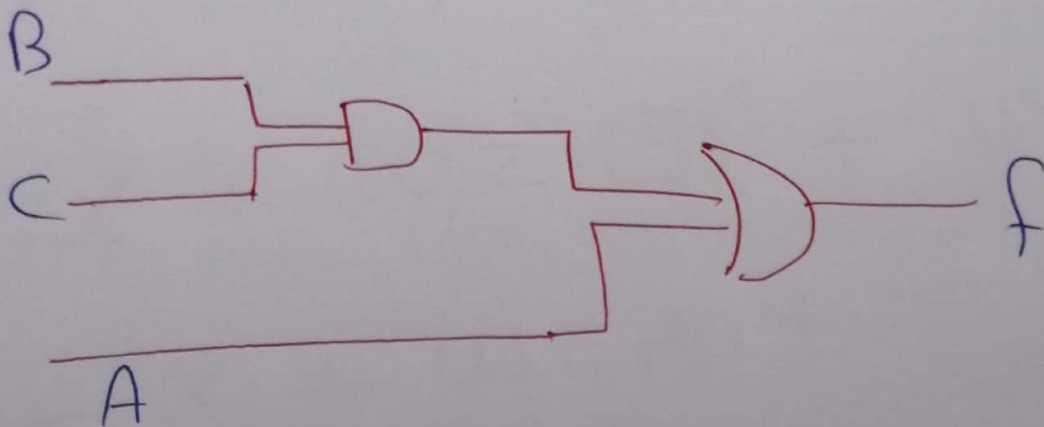
2 gates

25) Simplify and tell how many gates required?

$$wxyz + x\bar{z} + \bar{w}y + y\bar{z} + xz$$
$$+ w\bar{y}z$$

ans

$$x(\bar{z}+z) + wz(xy+\bar{y}) + yz + \bar{w}y$$

$$x + wz(x+\bar{y}) + yz + \bar{w}y$$

$$x + wzx + wz\bar{y} + yz + \bar{w}y$$

$$x(1+wz) + wz\bar{y} + y(\bar{z}+\bar{w})$$

$$(wz)(\bar{y}) + (y)(\overline{wz}) + x$$

$$= y \oplus wz + x$$

x, y, z, w
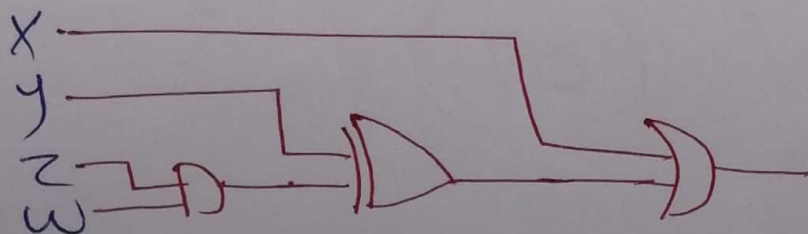
(3) three gattes

26) a truth table for

$AB + A\bar{B}$ has how many

Possible input Combinations

ans

لو عملنا ـــ احتمال يحتار

$$A(B + \bar{B}) = A$$

يبقى تحتار (2 inputs)

لو مشلناش و سبقنا زي عمرو

يبقى أربعة احتمالات ـ

```
CO
1  0
0  1
1  1
```

27) $F = \bar{A}BCD + A\bar{B}CD + \bar{A}\bar{B}\bar{C}D$

$+ ABCD + \bar{A}\bar{B}CD + ABC\bar{D}$

how many outPuts = 0

ans

بالنظر فقط لما zeros (10)

ليبقى ones (6)

28) $(A+\bar{B}+C)(\bar{A}+B+\bar{C})$

How many diff Combination
that make the $f = 1$

ans |
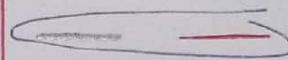
خذ اللي الـ ( ) ( )
اللي ولك فيه (1) مع
بعكس

A	B	C	O
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

6 Combinations

29

A
B

C
D

E
F
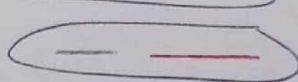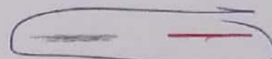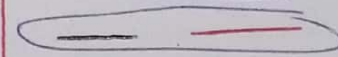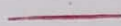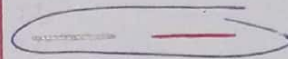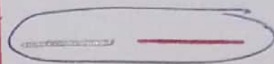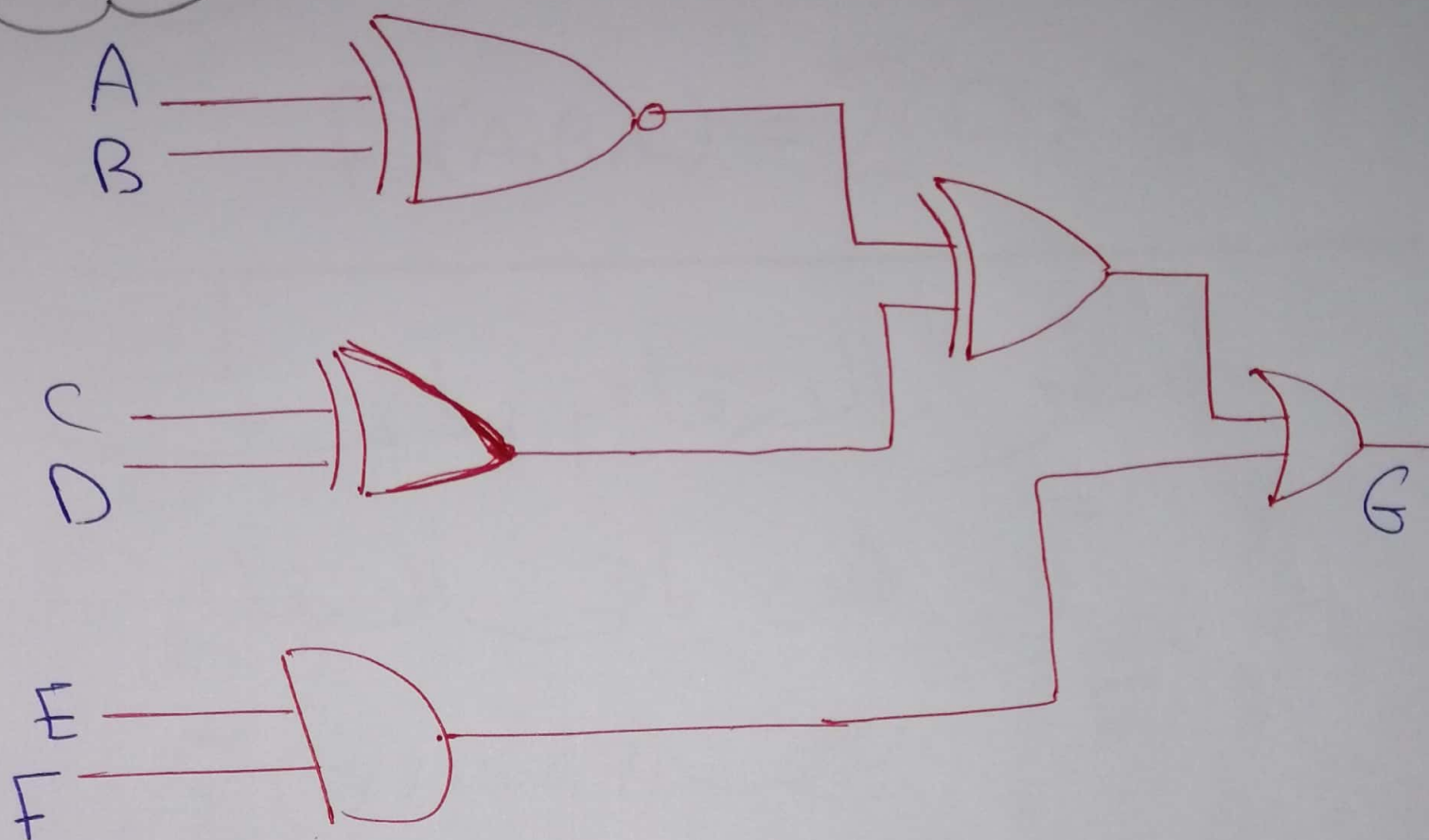
G = ---

---

ans

$$G = \left[\overline{(A \oplus B) \oplus (C \oplus D)} \right] + EF$$

30) the complement

of $F(A,B,C) = \sum(0, 2, 4)$

بالنظر الدرقام بتابت

ال $\bar{F}$ هي باقي الدرقام يعد

ال F يعني $\bar{F} = \sum(1, 3, 5, 6, 7)$

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8/12/2021