EL-205 (Digital electronics)
Question-Paper

Q-1

a) State any two advantages of digital electronics
(डिजिटल इलेक्ट्रोनिक्स के दो लाभ बताइए)

b) Convert into standard SOP expression
मानक SOP में परिवर्तित कीजिये
$AB + BC + CA$ (5)

Q-2 (a) Simplify using k-map
$f = \sum m_i (0, 1, 3, 4, 5, 6, 13) + d(11, 12, 14, 15)$
OR
(b)
X   Prove using Boolean Algebra :
$A + AB + ABC = A$ (5)

Q-3

a) write truth table of 2-input EX-NOR gate
(2-input EX-NOR गेट की सत्य तालिका बनाइये;)

b) Describe Demorgans theorem
(डिमॉर्गन प्रमेयों का वर्णन कीजिये)   (5)

Q-4

a) write symbol of each gate (minimum = 7 gate)

b) Draw EX-OR Gate by using NAND Gate.   (5)

Attempt Any three

Lecture PKT

Q-1| - 9) state any two advantage of digital electronics

Ans -1) An advantage of digital circuit is that signals represented digitally can be transmitted without degradation due to noise

2) each digit in digital circuit is handled by the same kind of hardware resulting in an easily scalable

b) $SOP = AB + BC + CA$

$\downarrow$ convert into ~~PoS form~~ standard SOP

$= ABC(C+\bar{C}) + BC(A+\bar{A}) + CA(B+\bar{B})$

$= ABC + AB\bar{C} + BCA + BC\bar{A} + CAB + CA\bar{B}$

$= ABC + AB\bar{C} + ABC + \bar{A}BC + ABC + A\bar{B}C$

$= 1\cdot1\cdot1 + 1\cdot1\cdot0 + 1\cdot1\cdot1 + 0\cdot1\cdot1 + 1\cdot1\cdot1 + 1\cdot0\cdot1$

$= m\sum(3, 5, 6, 7)$ (minterm)

Q-2| simplify using k-map

$f/ = \sum m_i (0, 1, 3, 4, 5, 6, 13) + d(11, 12, 14, 15)$

Ans| — this is Four variable (ABCD) k-map then $2^4 = 16$ Box in k-map,

Putting Digit '1' in box giving in minterm

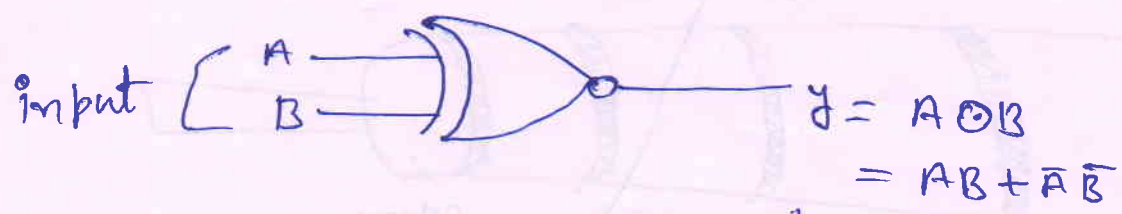Putting 'x' in box giving Dont care term (11, 12, 14, 15)

(P.T.O)

k-map

	CD 00	C̄D̄ 01	C̄D 11	CD̄ 10
ĀB̄ 00	1	1	1	0
ĀB 01	1	1	0	1
AB 11	X	1	X	X
AB̄ 10	0	0	X	0

There are ~~two~~ total Four group of one digit-1

(3 group of 4-box) + 1 group of 2-box

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

k-map is used for minimized of number of logic gates (minimization technic)

Q-3 | a) Write truth table of 2-input EX-NOR gate

Sol| — Symbol of EX-NOR Gate

input [A B]

$$Y = A \odot B$$
$$= AB + \bar{A}\bar{B}$$

OUTPUT

Truth table (सत्य सारणी)

Input		OUTPUT
A	B	$Y = A \odot B$
0	0	1
0	1	0
1	0	0
1	1	1

(P.T.O)

b) Describe De morgain theorem

sol) The complement of the sum of two or more variable is equal to product of the complement of the variables

as

$$\overline{A+B+C} = \overline{A} \cdot \overline{B} \cdot \overline{C}$$

The complement of the product of two or more variable is equal to sum of the complement of the variable

$$\overline{A \cdot B \cdot C} = \overline{A} + \overline{B} + \overline{C}$$

Q-4) a) write symbol of each gate

sol)

Name of gate		Symbol

AND $=$ $y = A \cdot B$

OR $=$ $y = A + B$

NAND $=$ $y = \overline{A \cdot B}$

NOR $=$ $y = \overline{A + B}$

EX-OR $=$ $y = A \oplus B = A\overline{B} + \overline{A}B$

EX-NOR $=$ $y = A \odot B = AB + \overline{A}\overline{B}$

NOT $=$ $\overline{A}$
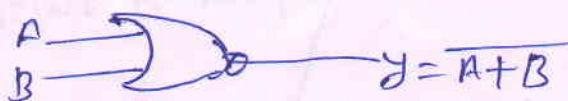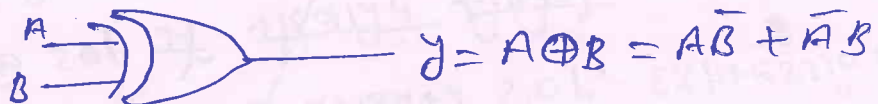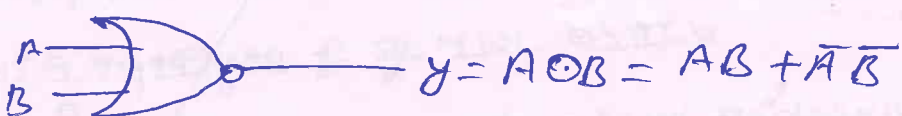
(P.T.O)

b) DRAW EX-OR Gate by using NAND Gate (4)

Sol)

$$y = A \oplus B = A\bar{B} + \bar{A}B$$
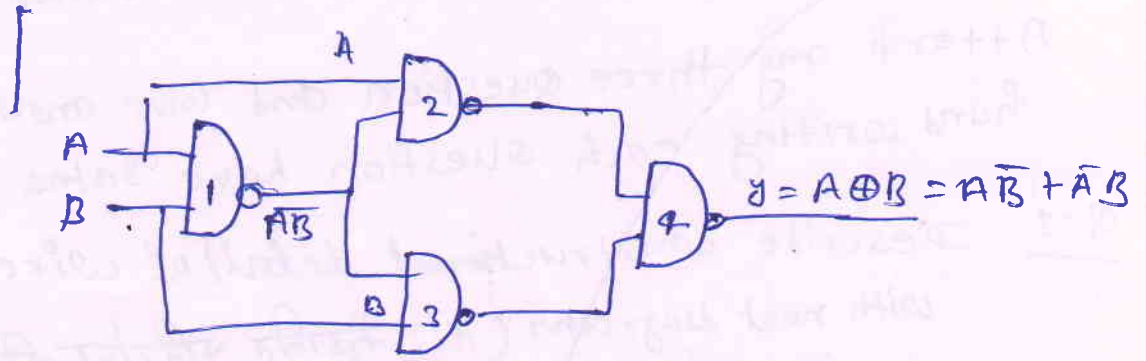
Total Four NAND Gate requir to make (design) the EX-OR Gate