

GPC - Bhi/wara

II - mid-term (2017-18)

M: M: 15

on: T: 60 min.

Subj: Digital electronics

Branch - Electronics

Code - 205-EL

Q-1 Explain Full adder (F.A) (Definition, symbol, Truth table equation, logic-ckt) — ② mark

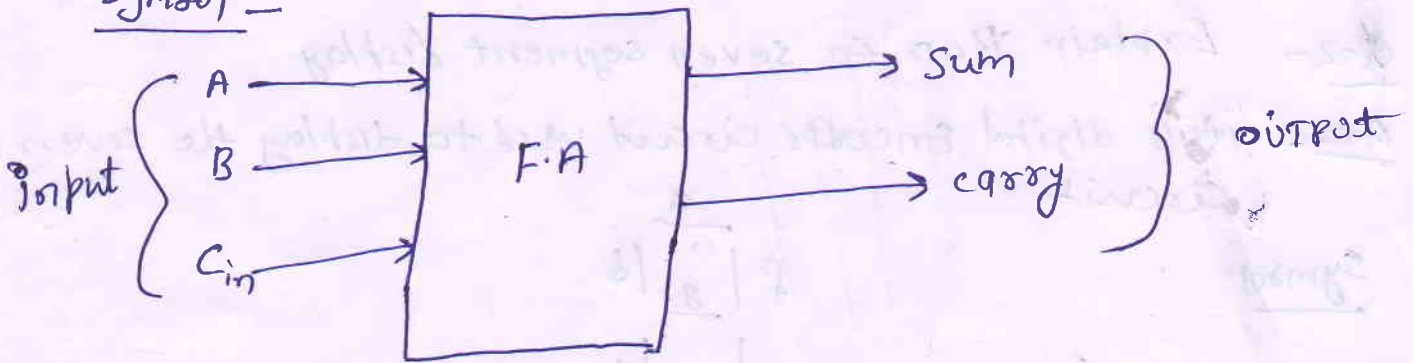
Q-2 - Explain BCD to seven segment display — ② mark

Q-3 - Explain (1x4) mux — ③ mark.

Q.-2 Explain Full adder (F.A)

Ans. - Definition \rightarrow A Full adder is a digital circuit that performs addition, it adds three one-bit binary number (A, B, and C_{in}) and output two one-bit binary.

Symbol -



Truth table \rightarrow

input			OUTPUT	
A	B	C_{in}	Sum	Carry
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

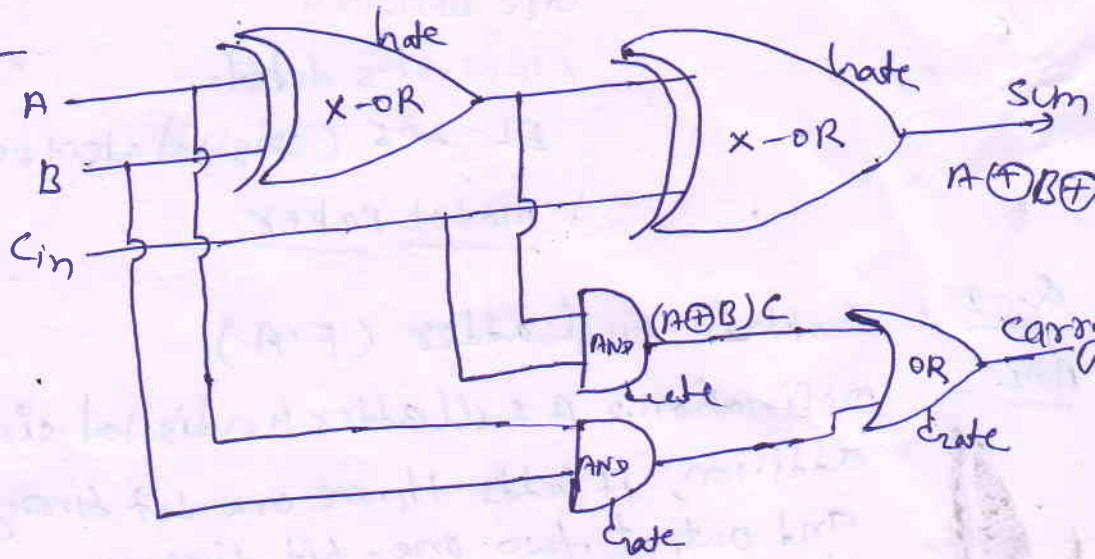
Equation - $Sum\ So = \bar{A}\bar{B}C_{in} + \bar{A}B\bar{C}_{in} + A\bar{B}\bar{C}_{in} + ABC_{in}$

$= A \oplus B \oplus C_{in}$

Carry = $\bar{A}BC_{in} + A\bar{B}C_{in} + A\bar{B}\bar{C}_{in} + AB\bar{C}_{in}$

$(A \oplus B)C_{in} + AB$

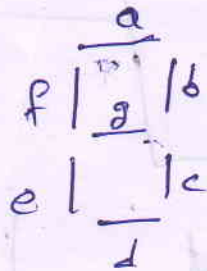
Logic circuit



Q-2- Explain BCD to seven segment display

Ans- it is digital encoder circuit used to display the seven segments circuit

Symbol



truth table

decimo	input				OUTPUT						
decimo	A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	0	1	1	1	1	1	1	0
1	0	0	0	1	0	1	1	0	0	0	0
2	0	0	1	0	1	1	0	1	1	0	1
3	0	0	1	1	1	1	1	1	0	0	1
4	0	1	0	0	0	1	1	0	0	1	1
5	0	1	0	1	1	0	1	0	1	1	1
6	0	1	1	0	0	0	1	1	1	1	1
7	0	1	1	1	1	1	1	1	1	1	1
8	1	0	0	0	1	1	1	0	0	1	1
9	1	0	0	1	1	1	1	0	0	1	1

Logic equation ← $a = A + c + B D + \bar{B} \bar{D}$

$b = \bar{B} + \bar{c} \bar{D} + C D$

$c = B + \bar{e} + D$

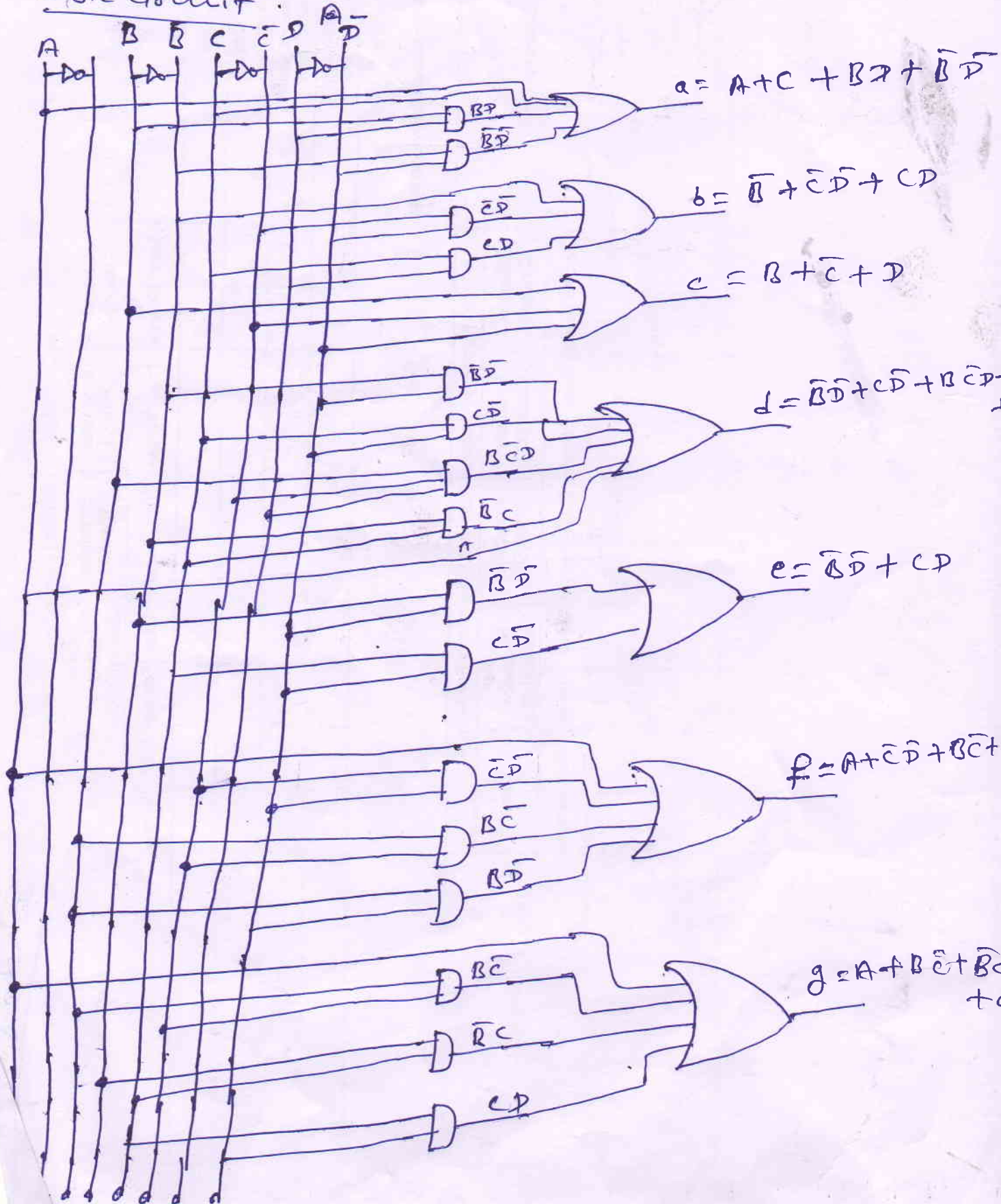
$$d = \bar{B}\bar{D} + c\bar{D} + B\bar{C}D + \bar{B}c + A$$

$$e = \bar{B}\bar{D} + c\bar{D}$$

$$f = A + \bar{C}\bar{D} + B\bar{C} + B\bar{D}$$

$$g = A + B\bar{C} + \bar{B}c + c\bar{D}$$

Logic circuit

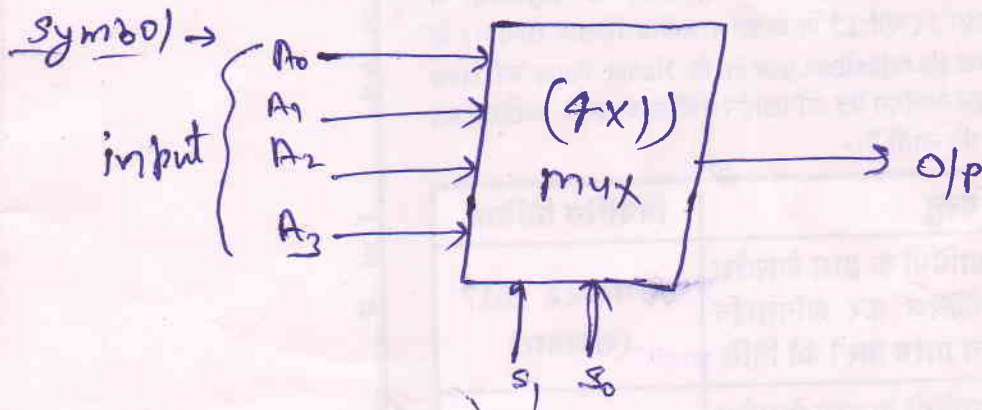


Q-3 - Explain (4×1) mux

Ans
multiplexer \rightarrow it is digital combinational type circuit
it is also called serial to parallel converter.
it select the input by selection line.

ex- (4×1) mux $\rightarrow (2^2 \times 1)$

it has 4-input line and 2-selection line



it has many input and only one o/p line

s_1	s_0	A_3	A_2	A_1	A_0	O/P
0	0	0	0	0	1	1
0	1	0	0	1	0	1
1	0	0	1	0	0	1
1	1	1	0	0	0	1

$$O/P = \bar{s}_1 \bar{s}_0 A_0 + \bar{s}_1 s_0 A_1 + s_1 \bar{s}_0 A_2 + s_1 s_0 A_3$$