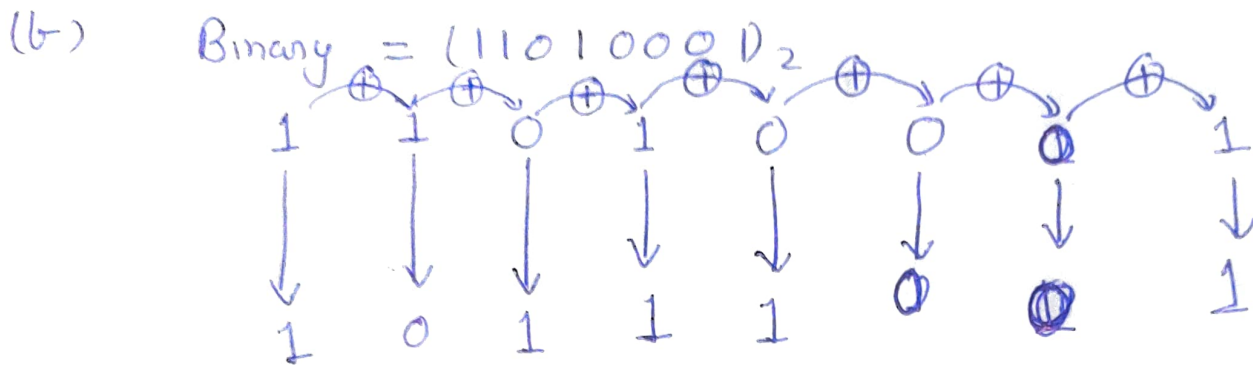


Solution 1  $\rightarrow$  (a)  $(987.123)_{10}$

BCD = 1001 1000 0111 . 0001 0010 0011

①

Excess 3 = 1100 1011 1010 . 0100 0101 0110 ——— ①



Solution 2  $\rightarrow$  (a)  $X = 1010100$  ——— (0.5)

2's C of  $Y = +0111101$  ——— (0.5)

Discard Carry.  $10010001$  ——— (0.5)

$X - Y = 0010001$  ——— (0.5)

(b)  $Y = 1000011$

2's C of  $X = +0101100$  ——— (0.5)

1101111

Since there is no end carry. Therefore the answer will be

$Y - X = -0010001$  ——— (0.5)

### Solution 3

$\therefore$  A and B are successive numbers.

$$B = A + 1 \text{ ————— given — (i)}$$

$$(AB)x = 29$$

$$\text{or } Ax + B = 29 \text{ ————— (ii)}$$

Also

$$(BA)x = 34$$

$$Bx + A = 34 \text{ ————— (iii)}$$

Substitute (i) in (ii) then

$$Ax + A + 1 = 29 \Rightarrow Ax + A = 28 \text{ ---- (iv)}$$

Now substitute (i) in (iii) then

$$Ax + x + A = 34 \text{ ---- (v)}$$

From (iv) and (v)  $x = 34 - 28 = 6$

$$\therefore \boxed{x = 6} \text{ ————— (0.5)}$$

Substitute the value of x in (iv)

$$6A + A = 28 \Rightarrow A = \frac{28}{7} = 4$$

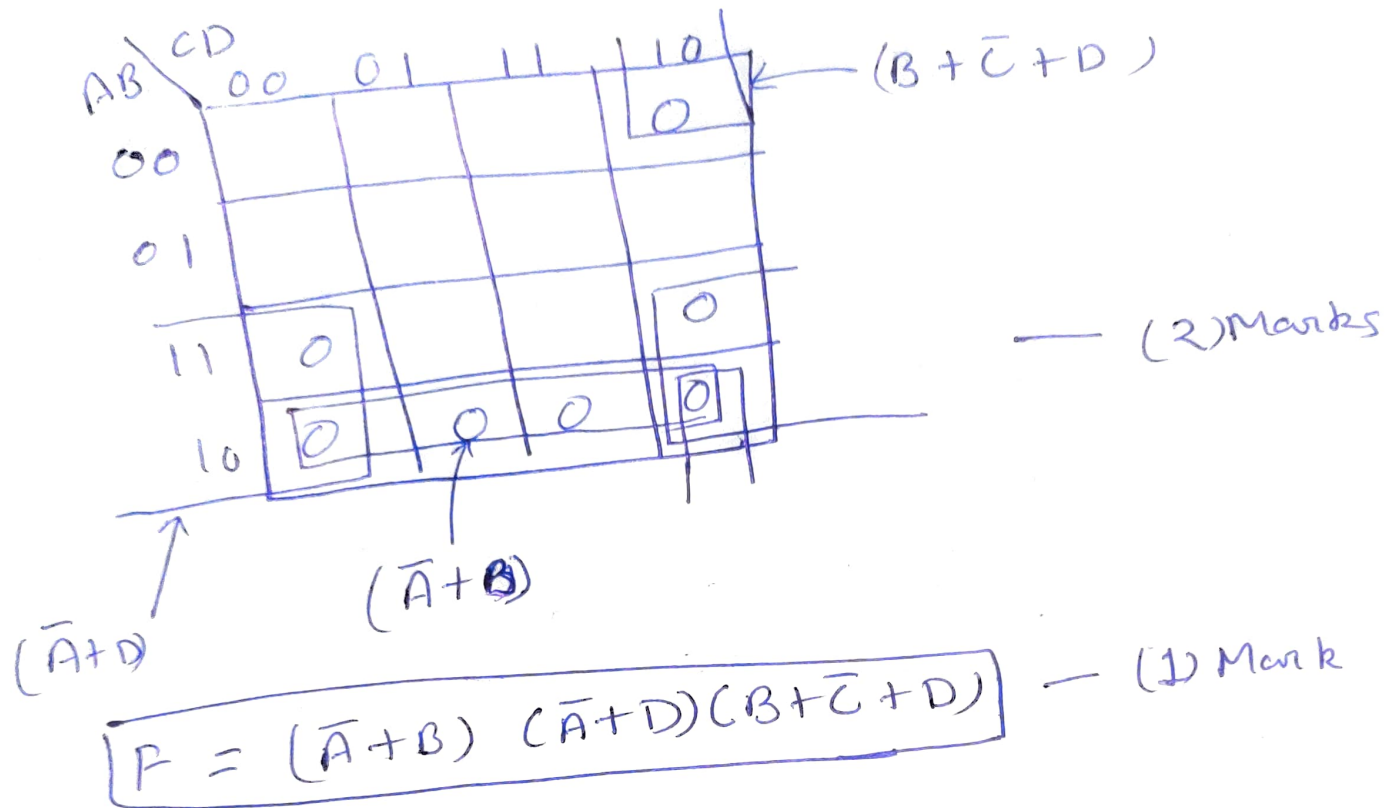
$$\boxed{A = 4} \text{ ————— (0.5)}$$

and

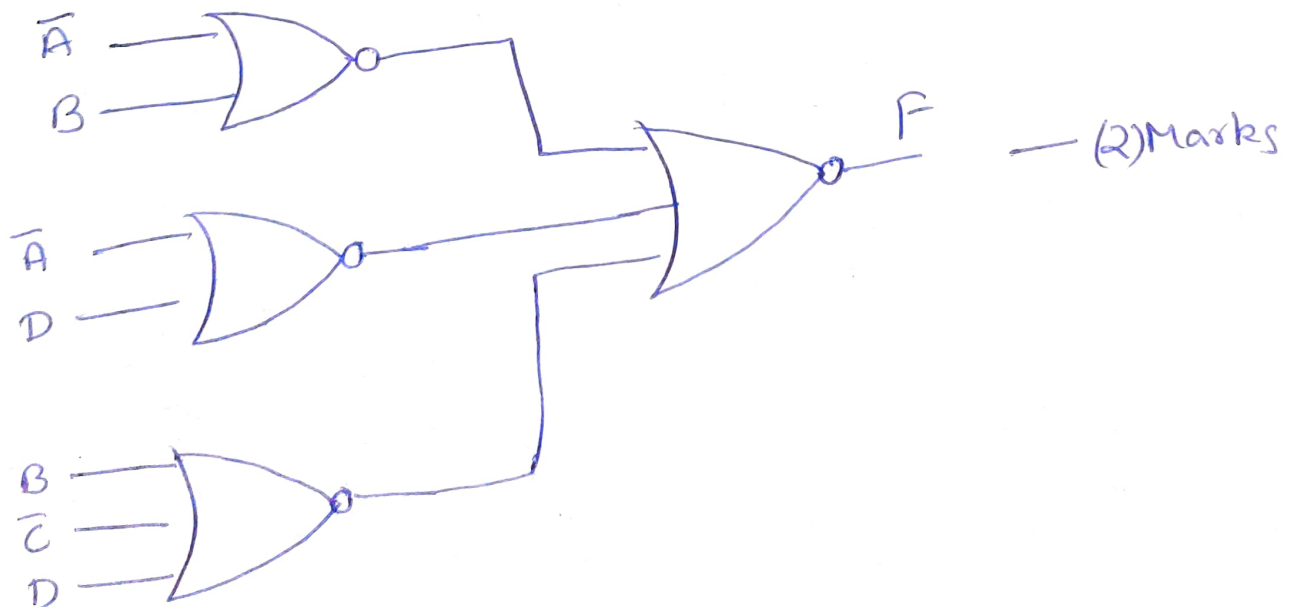
$$\boxed{B = A + 1 = 4 + 1 = 5} \text{ ————— (0.5)}$$

# Soluhon 4

$$F(A, B, C, D) = \sum m(2, 8, 9, 10, 11, 12, 14)$$



Implementation using NOR.



Solution 5  $\rightarrow F(A,B,C) = \Sigma(3,4,6,7)$

3	011
4	100
6	110
7	111

Group 1	4	100
Group 2	3	011
	6	110
Group 3		111

(4,6)	1 - 0
(3,7)	- 1 1
(6,7)	1 1 -

— (1-5) Marks

		3	4	6	7
(4,6)	$(A\bar{C})$		$\otimes$	$\times$	
(3,7)	$(\bar{B}C)$	$\otimes$			$\times$
(6,7)	$AB$			$\times$	$\times$

$$\therefore F = A\bar{C} + BC$$

(1) Mark

(1-5) Marks

Solution 6  $F(A,B,C) = ABC + \bar{A}B\bar{C} + ABC + \bar{A}B\bar{C} = \Sigma m(1,2,7)$

For BC

	$I_0$	$I_1$	$I_2$	$I_3$
$\bar{A}$	0	①	②	3
A	4	5	⑥	⑦
	0	$\bar{A}$	$\bar{A}$	A

(2) Marks

For AB

	$I_0$	$I_1$	$I_2$	$I_3$
$\bar{C}$	0	③	4	⑥
C	①	3	5	⑦
	C	$\bar{C}$	0	①

For AC

	$I_0$	$I_1$	$I_2$	$I_3$
$\bar{B}$	0	①	4	5
B	②	3	⑥	⑦
	B	$\bar{B}$	B	B

