Q1. If $A > B$, $F = 2A + 3B$

else
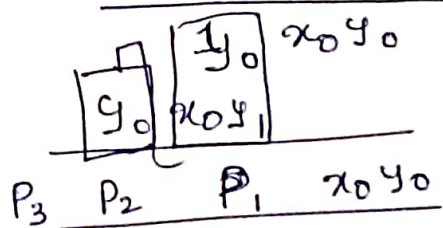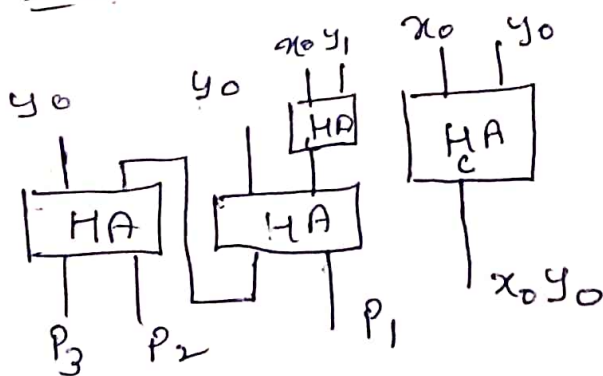
$$F = 3A - 2B$$

A & B are 2-bit binary numbers.

$A \downarrow 2 \quad \downarrow B_2$

7485

$\langle \quad \rangle \quad \langle \rangle \quad =$

$\begin{array}{c} < & -0 \\ > & -0 \\ = & -1 \end{array}$ } ½M

$A_1 A_0$

$B_1 B_0$

} ½M

1

2x2-bit
multiplier

1

2x2-bit
multiplier

½M

7483 Ic

$\overline{G}$

} ½M

$C \quad S_3 \quad S_0$

$2 = 10$
$3 = 11$

2x2-bit multiplier : $x_0 \times y_1 y_0$

y_0

$x_0 y_1 \quad x_0 \quad y_0$

y_0

HA

$x_0 y_0$

HA

HA
C

$\begin{array}{cc} & y_0 \quad x_0 y_0 \\ y_0 & x_0 y_1 \end{array}$

$P_3 \quad P_2 \quad P_1 \quad x_0 y_0$

HA

HA

$x_0 y_0$

$P_3 \quad P_2$

P_1
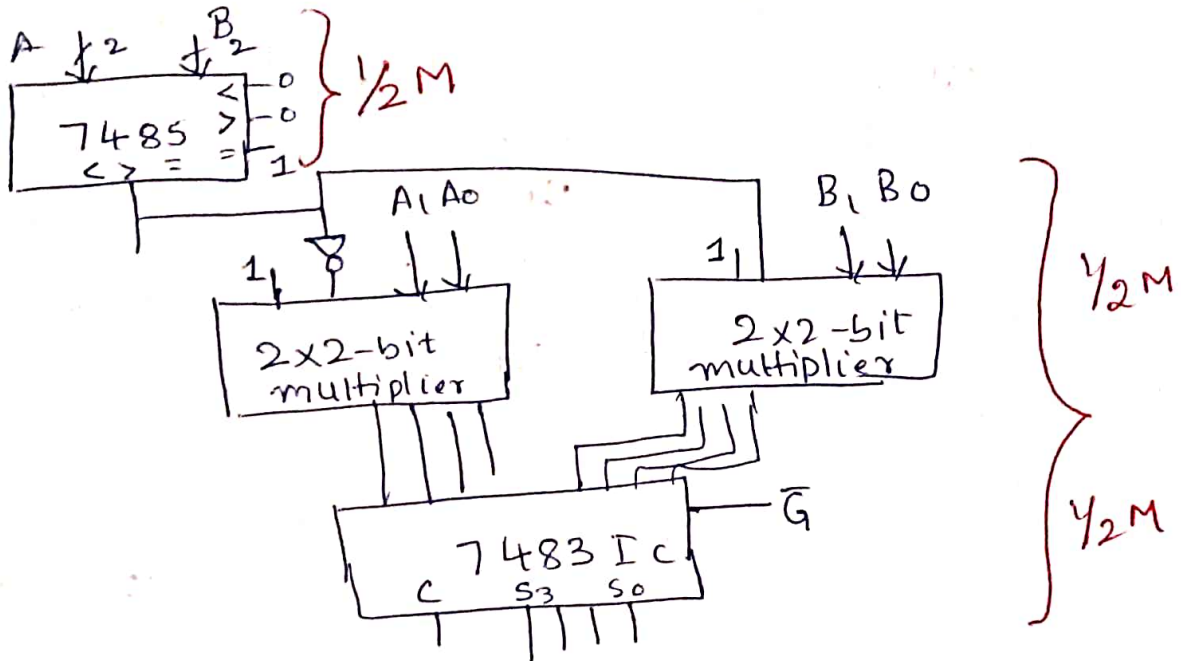
HA as AND gate: ½M.
Multiplier design }
using HAS } 1M