Electronics & Telecommunication (E C)

Combinational Circuits

Multiplexers Question Solving - I

Importance Meter

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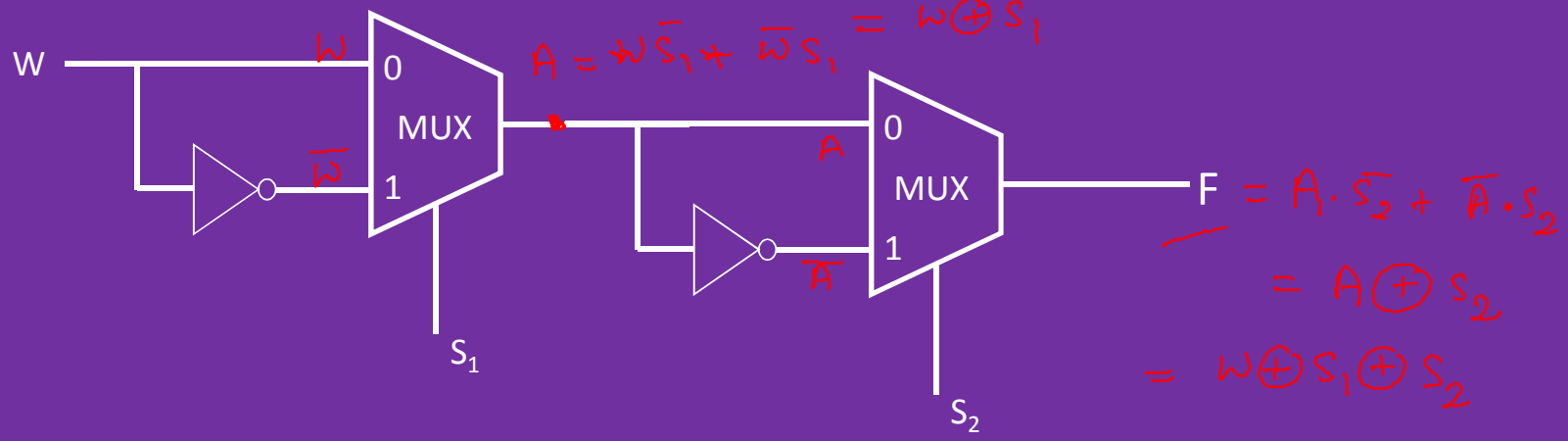
Q – 1 Consider the multiplexer based logic circuit shown in the figure.

GATE 2014 EC
Marks: 1

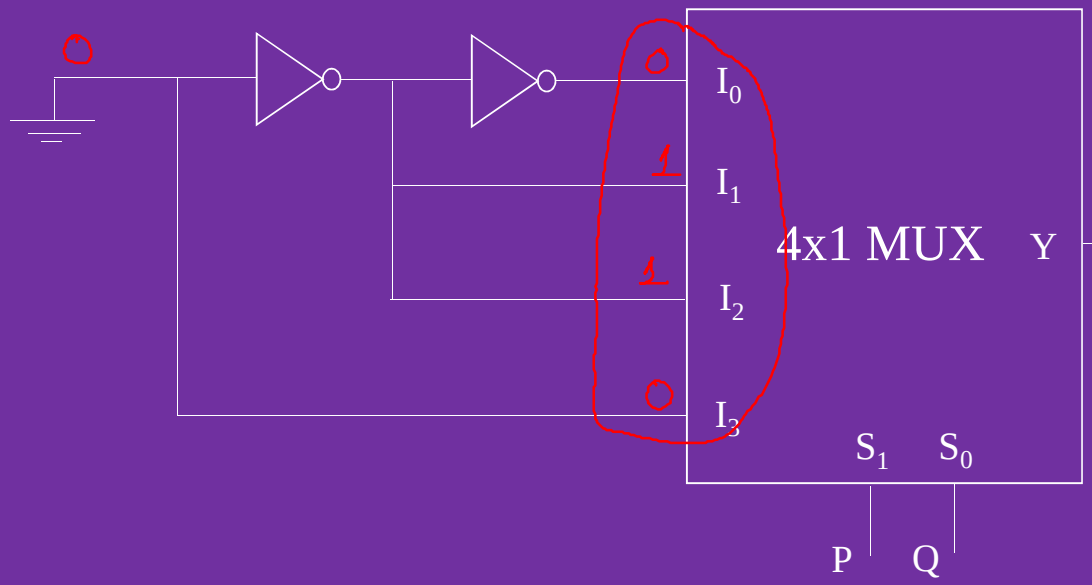


Which of the following Boolean functions is realized by circuit ?

A) $W\,\overline{S_1}\,\overline{S_2}$ **B)** $WS_1 + WS_2 + S_1S_2$ **C)** $\overline{W} + S_2 + S_2$ **D)** $W \oplus S_1 \oplus S_2$

Q – 2 The logic function implemented by the circuit below is

GATE 2011 EC
Marks: 1



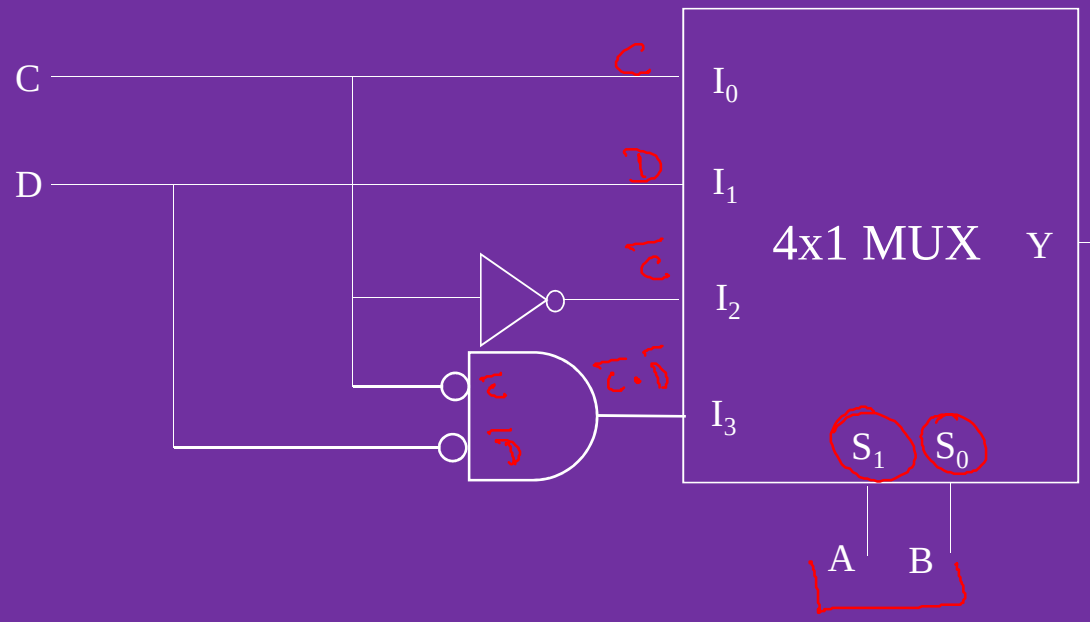
$F = 0 \cdot \bar{P}\bar{Q} + 1 \cdot P\bar{Q} + 1 \cdot \bar{P}Q + 0 \cdot PQ$

$= P\bar{Q} + \bar{P}Q = P \oplus Q$

A) F = AND (P , Q) **B) F = OR (P , Q)** **C) F = XNOR (P , Q)** **D) F = XOR (P , Q)** ✓

Q – 3 The Boolean function realized by the logic circuit shown is

GATE 2010 EC
Marks: 2

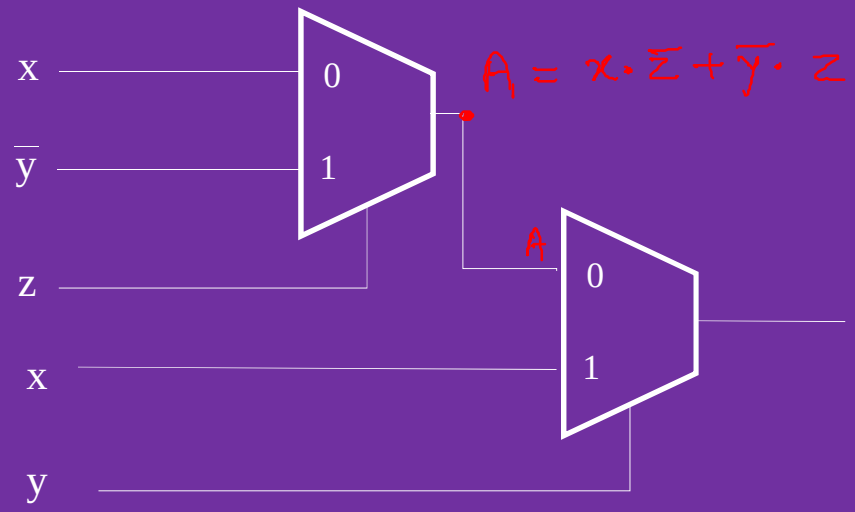


A) $F = \sum m(0, 1, 3, 5, 9, 10, 14)$ **B)** $F = \sum m(2, 3, 5, 7, 8, 12, 13)$

C) $F = \sum m(1, 2, 4, 5, 11, 14, 15)$ **D)** $F = \sum m(2, 3, 5, 7, 8, 9, 12)$

Q – 4 Consider the circuit shown. Which of the following options correctly represents $f(x,y,z)$?

GATE 2006 CSIT
Marks: 2



$f = A \cdot \bar{y} + x \cdot y$

$= x \cdot \bar{z} \bar{y} + \bar{y} \cdot z \cdot \bar{y} + x \cdot y$

$= x \bar{y} \bar{z} + z \cdot \bar{y} + xy$

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

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

$\Rightarrow xy + x\bar{z} + \bar{y}z.$

A) $x\bar{z} + xy + \bar{y}z$

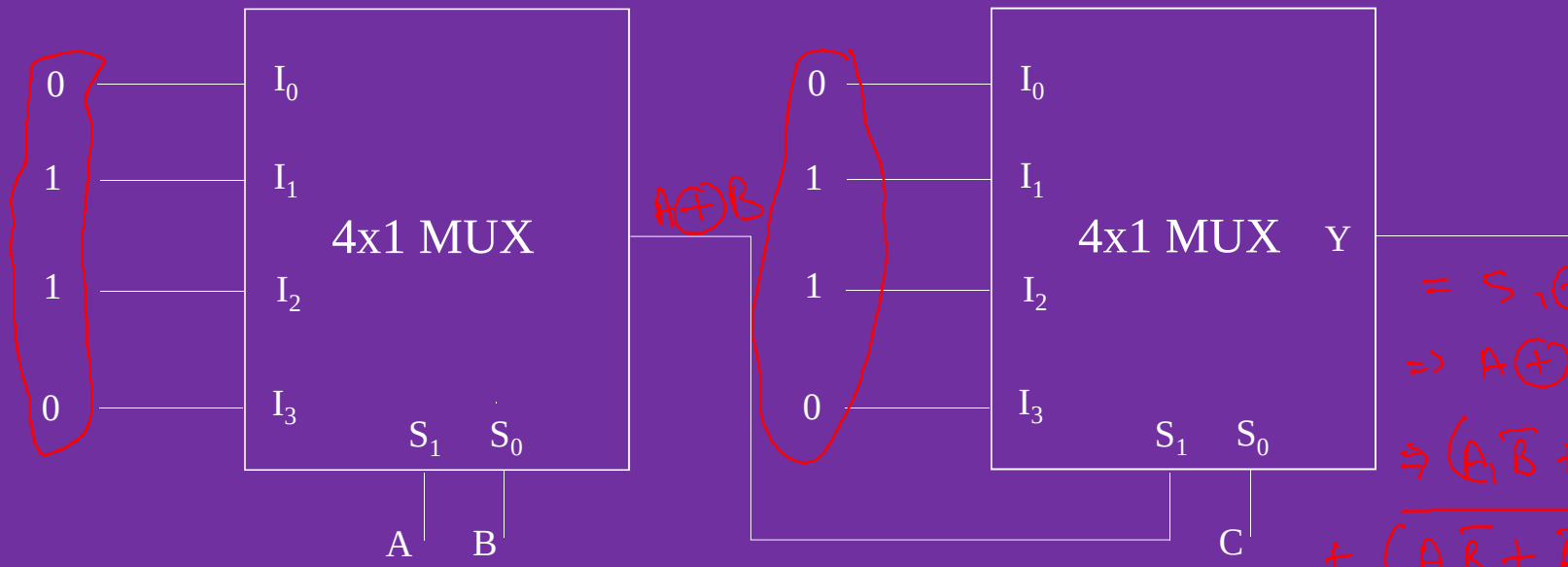
B) $x\bar{z} + xy + \overline{yz}$

C) $xz + xy + \overline{yz}$

D) $xz + x\bar{y} + \bar{y}z$

Q – 5 In the following circuit, X is given by :-

GATE 2007 EC
Marks: 2



A) $X = A\bar{B}\bar{C} + \bar{A}B\bar{C} + \bar{A}\bar{B}C + ABC$

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

C) $X = AB + BC + AC$

D) $X = \bar{A}B + B\bar{C} + AC$

$= S_1 \oplus S_0$

$\Rightarrow A \oplus B \oplus C$

$\Rightarrow (A\bar{B} + \bar{A}B) \cdot \bar{C} + \overline{(A\bar{B} + \bar{A}B)} \cdot C$

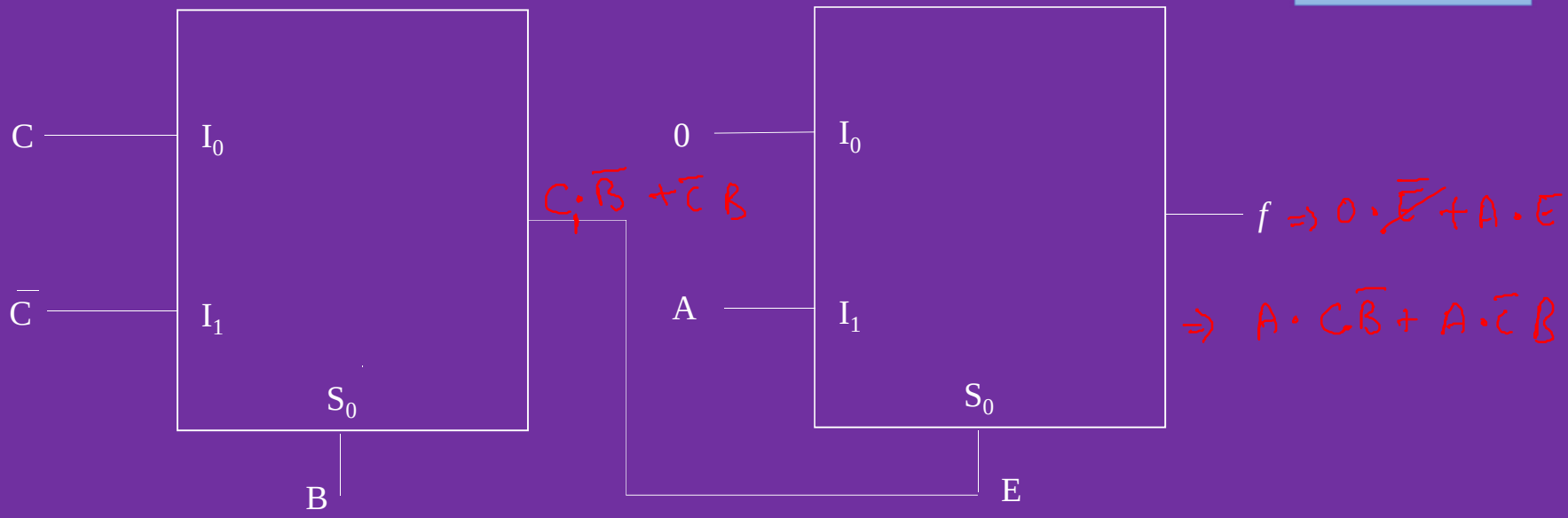
$\Rightarrow A\bar{B}\bar{C} + \bar{A}B\bar{C} + \overline{(A\bar{B} \cdot \bar{A}B)} \cdot C$

$\Rightarrow (\bar{A} + B)(A + \bar{B}) \cdot C$

$= \bar{A}\bar{B}C + BAC$

Q – 6 The Boolean function *f* implemented in the figure using two input multiplexers is:

GATE 2005 EC
Marks: 1



A) $A\bar{B}C + AB\bar{C}$ **B)** $ABC + A\bar{B}\bar{C}$ **C)** $\bar{A}BC + \bar{A}\bar{B}\bar{C}$ **D)** $\bar{A}\bar{B}C + \bar{A}B\bar{C}$

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Thank you