

$m_0$	0	0	0	0	0	✓	$m_{0,2}$	0	0	0	-	0	✓	$m_{0,2,4,6}$	0	0	-	-	0	>
							$m_{0,4}$	0	0	-	0	0	✓	$m_{0,4,2,6}$	0	0	-	-	0	>
$m_2$	0	0	0	1	0	✓	$m_{0,16}$	-	0	0	0	0								
$m_4$	0	0	1	0	0	✓								$m_{2,6,10,14}$	0	-	-	1	0	>
$m_{16}$	1	0	0	0	0	✓	$m_{2,6}$	0	0	-	1	0	✓	$m_{2,10,6,14}$	0	-	-	1	0	>
							$m_{2,10}$	0	-	0	1	0	✓							
$m_6$	0	0	1	1	0	✓	$m_{4,6}$	0	0	1	-	0	✓	$m_{10,14,26,30}$	-	1	-	1	0	>
$m_8$	0	1	0	0	1	✓	$m_{16,17}$	1	0	0	0	-		$m_{10,26,14,30}$	-	1	-	1	0	>
$m_{10}$	0	1	0	1	0	✓														
$m_{17}$	1	0	0	0	1	✓	$m_{6,14}$	0	-	1	1	0	✓	$m_{14,15,30,31}$	1	1	1	-		>
							$m_{9,13}$	0	1	-	0	1		$m_{14,30,15,31}$	-	1	1	1	-	>
$m_{13}$	0	1	1	0	1	✓	$m_{10,14}$	0	1	-	1	0	✓							
$m_{14}$	0	1	1	1	0	✓	$m_{10,26}$	-	1	0	1	0	✓							
$m_{21}$	1	0	1	0	1	✓	$m_{17,21}$	1	0	-	0	1								
$m_{26}$	1	1	0	1	0	✓														
$m_{28}$	1	1	1	0	0	✓	$m_{13,15}$	0	1	1	-	1								
							$m_{14,15}$	0	1	1	1	-	✓							
$m_{15}$	0	1	1	1	1	✓	$m_{14,30}$	-	1	1	1	0	✓							
$m_{30}$	1	1	1	1	0	✓	$m_{26,30}$	1	1	-	1	0	✓							
							$m_{28,30}$	1	1	1	-	0								
$m_{31}$	1	1	1	1	1															
							$m_{15,31}$	-	1	1	1	1	✓							
							$m_{30,31}$	1	1	1	1	-	✓							

a) Prime Implicants:

$$\begin{aligned}
 m_{0,16} &= (\neg B \wedge \neg C \wedge \neg D \wedge \neg E) & m_{0,2,4,6} &= (\neg A \wedge \neg B \wedge \neg E) \\
 m_{16,17} &= (A \wedge \neg B \wedge \neg C \wedge \neg D) & m_{2,6,10,14} &= (\neg A \wedge D \wedge \neg E) \\
 m_{9,13} &= (\neg A \wedge B \wedge \neg D \wedge E) & m_{10,14,26,30} &= (B \wedge D \wedge \neg E) \\
 m_{17,21} &= (A \wedge \neg B \wedge \neg D \wedge E) & m_{14,15,30,31} &= (B \wedge C \wedge D) \\
 m_{13,15} &= (\neg A \wedge B \wedge C \wedge E) & & \\
 m_{28,30} &= (A \wedge B \wedge C \wedge E) & & 
 \end{aligned}$$

	$m_0$	$m_2$	$m_4$	$m_6$	$m_8$	$m_{10}$	$m_{12}$	$m_{14}$	$m_{15}$	$m_{16}$	$m_{17}$	$m_{21}$	$m_{26}$	$m_{28}$	$m_{30}$	$m_{31}$
$m_0, 16$	✓															
★ $m_8, 17$										✓						
★ $m_9, 13$					✓		✓			✓	✓					
★ $m_{17}, 21$												✓	✓			
★ $m_{13}, 15$							✓		✓							
★ $m_{28}, 30$																
★ $m_0, 2, 4, 6$	✓	✓	✓	✓										✓	✓	
$m_2, 6, 10, 14$		✓		✓		✓		✓								
★ $m_{10}, 14, 26, 30$					✓			✓					✓		✓	
★ $m_{14}, 15, 30, 31$						✓		✓	✓						✓	✓
	2	2	1	2	1	2	2	3	2	2	2	1	1	1	3	1

b) Essential Prime Implicants:

$$m_9, 13 + m_{17}, 21 + m_{28}, 30 + m_0, 2, 4, 6 + m_{10}, 14, 26, 30 + m_{14}, 15, 30, 31$$

c)

$$\begin{aligned}
 p'(A, B, C, D, E) = & (\neg A \wedge B \wedge \neg D \wedge E) \vee (A \wedge \neg B \wedge \neg D \wedge E) \\
 & \vee (A \wedge B \wedge C \wedge \neg E) \vee (\neg A \wedge \neg B \wedge \neg E) \\
 & \vee (B \wedge D \wedge \neg E) \vee (B \wedge C \wedge D)
 \end{aligned}$$