

**Question 1**

**Q1 EVEN**

Use the Quine-McCluskey method to find the list of prime implicants of function:  $Z(a,b,c,d) = \sum m(0,3,8,10) + dc(1,2,11)$

Group	minterm	a	b	c	d	
0	0	0	0	0	0	√
1	1	0	0	0	1	x
	2	0	0	1	0	x
	8	1	0	0	0	√
2	3	0	0	1	1	√
	10	1	0	1	0	√
3	11	1	0	1	1	x

Group	minterm	a	b	c	d	
0	0,1	0	0	0	-	√
	0,2	0	0	-	0	√
	0,8	-	0	0	0	√
1	1,3	0	0	-	1	√
	2,3	0	0	1	-	√
	2,10	-	0	1	0	√
	8,10	1	0	-	0	√
2	3,11	-	0	1	1	√
	10,11	1	0	1	-	√

Group	minterm	a	b	c	d	
0	0,1,2,3	0	0	-	-	A
	0,2,8,10	-	0	-	0	B
1	2,3,10,11	-	0	1	-	C

**PI: {A, B, C} = {a'b', b'd', b'c}**

**Question 2**

The list of the prime implicants of the incomplete specified function

$F(v,w,x,y,z) = \sum m(4,5,9,11,12,14,15,27,30) + dc(1,17,25,26,31)$  is given next.

Find a minimal expression of the function F by using the prime implicants table method.

PI	midterms		UC	4	5	9	11	12	14	15	27	30	No EPI's
A	1,9,17,25	x'y'z	4			1							Col 27 > 11 → eliminate 27, uc=
B	9,11,25,27	wx'z	4			1	1				±		
C	11,15,27,31	wyz	4				1			1	±		
D	14,15,30,31	wxy	4						1	1		1	
E	26,27,30,31	vwy	4								±	1	
F	1,5	v'w'y'z	5		1								
G	4,5	v'w'xy'	5	1	1								
H	4,12	v'xy'z'	5	1				1					
I	12,14	v'wxz'	5					1	1				

PI	midterms		UC	4	5	9	11	12	14	15	30	
A	1,9,17,25	x'y'z	4			±						
B	9,11,25,27	wx'z	4			1	1					Row B > A → eliminate A, uc=
C	11,15,27,31	wyz	4				1			1		
D	14,15,30,31	wxy	4						1	1	1	Row D > E → eliminate E, uc=
E	26,27,30,31	vwy	4								±	
F	1,5	v'w'y'z	5		±							Row G > F → eliminate F, uc=
G	4,5	v'w'xy'	5	1	1							
H	4,12	v'xy'z'	5	1				1				
I	12,14	v'wxz'	5					1	1			

PI	midterms		UC	4	5	9	11	12	14	15	30	SEPI: B, D, G,
				√	**	**	√		√	√	**	SEPI eliminate rows B, D, G
B**	9,11,25,27	wx'z	4			±	±					
C	11,15,27,31	wyz	4				±			±		SEPI eliminate columns
D**	14,15,30,31	wxy	4						±	±	±	4,5,9,11,14,15,30
G**	4,5	v'w'xy'	5	±	±							
H	4,12	v'xy'z'	5	±				1				
I	12,14	v'wxz'	5					1	±			

PI	midterms		UC	12	No TEPI
H	4,12	v'xy'z'	5	1	
I	12,14	v'wxz'	5	1	

$F(v,w,x,y,z) = wx'z + wxy + v'w'xy' + v'xy'z'$

$F(v,w,x,y,z) = wx'z + wxy + v'w'xy' + v'wxz'$