Name_____ **Student ID**_____ **Colleges & Schools**_____ **Department**_____

Quiz Unit 6 Solutions

1. The function f is given as

$$f(a, b, c, d, e) = \sum m\,(0, 2, 3, 5, 7, 9, 11, 13, 14, 16, 18, 24, 26, 28, 30).$$

All the prime implicants for the function f can be found by using the Quine-McCluskey method such as b′c′e′ (0, 2, 16, 18), ac′e′ (16, 18, 24, 26), abe′ (24, 26, 28, 30), a′b′c′d (2, 3), a′b′de (3, 7), a′c′de (3, 11), a′b′ce (5, 7), a′cd′e (5, 13), a′bc′e (9, 11), a′bd′e (9, 13), bcde′ (4, 30). And then, the prime implicant chart is obtained as shown below.

	0	2	3	5	7	9	11	13	14	16	18	24	26	28	30
(0, 2, 16, 18)	×	×								×	×				
(16, 18, 24, 26)										×	×	×	×		
(24, 26, 28, 30)												×	×	×	×
(2, 3)		×	×												
(3, 7)			×		×										
(3, 11)			×				×								
(5, 7)				×	×										
(5, 13)				×				×							
(9, 11)						×	×								
(9, 13)						×		×							
(14, 30)									×						×

(a) Determine the essential prime implicants.

Sol.) b′c′e′, abe′, bcde′

(b) Find all minimum sum-of-products solutions using the prime implicant chart shown above.

Sol.) f = b′c′e′ + abe′ + a′c′de + a′b′ce + a′bd′e + bcde′

f = bcde′ + b′c′e′ + abe′ + a′b′de + a′cd′e + a′bc′e