

Advanced Level **ICT**



Information Communication Technology

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1. i. Write hexadecimal equivalent for followings.
 - a) 100011101100_2
 - b) 1111000100111_2
 - ii. Write decimal equivalent for followings.
 - a) 1000111011_2
 - b) 10000101_2
 - c) 11100011_2
 - iii. Write Binary equivalent for followings.
 - i. 561_8
 - ii. 1037_{10}
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2. i. The decimal number for 'C' in ASCII is 67. Then what is the Binary value of 'P' in order to ASCII?
 - ii. Prove the following Boolean theorem using truth tables.
 $a+b+c = abc$
 - iii. Simplify the following Boolean equations using laws of Boolean algebra.
 - i. $x(xy)$
 - ii. $x+(xy)$
 - iii. $x+(x+y)$
 - iv. $a(b+a)$
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3. Simplify following Boolean equations using K-maps.
 - i. $F = \overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}C + \overline{A}B\overline{C} + \overline{A}BC$
 - ii. $F = \overline{A}\overline{B}C + \overline{A}BC + A\overline{B}C + ABC$
 - iii. $F = \overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}C + \overline{A}B\overline{C} + \overline{A}BC + A\overline{B}\overline{C} + ABC$
 - iv. $F = \overline{A}\overline{B}\overline{C} + \overline{A}\overline{B}C + \overline{A}B\overline{C} + \overline{A}BC + A\overline{B}\overline{C} + A\overline{B}C$
 - v. $F = \overline{\overline{A}\overline{B} + \overline{A}\overline{C} + BCD}$
 - vi. $F = \overline{A}B\overline{C}\overline{D} + \overline{A}BC\overline{D} + A\overline{B}\overline{C}\overline{D} + A\overline{B}C\overline{D} + ABC\overline{D} + \overline{A}B\overline{C}D + \overline{A}BCD + \overline{A}BCD$

4. A digital circuit takes four binary digits as an input and produces binary 1 outputs in when all four binary digits represents 2,3, 4,6,7 11,13, and 14.

Assume all binary digits represent positive decimal values.

i.

P	ii. Q	R	S	F(P,Q,R,S)
0	iii. 0	0	0	
0	iv. 0	0	1	
0	v. 0	1	0	
0	vi. 0	1	1	
0	vii. 1	0	0	
0	viii. 1	0	1	
0	ix. 1	1	0	
0	x. 1	1	1	
1	xi. 0	0	0	
1	xii. 0	0	1	
1	xiii. 0	1	0	
1	xiv. 0	1	1	
1	xv. 1	0	0	
1	xvi. 1	0	1	
1	xvii. 1	1	0	
1	xviii. 1	1	1	
1	xix. 1	1	1	

xxx.

- i. The following truth table is designed to describe the above circuit, in which A,B,C, and D represents the four binary inputs and F(A,B,C,D) as the output of the circuit. Copy the truth table to your answer sheet and complete it.
- ii. Write the Boolean expression to represent in the logic function of the above circuit in **Standard Sum of product (SOP)** and **Standard Product of Sun (POS)**
- iii. Simplify the **SOP** expression using Kanaugh's map method.
- iv. Draw a logic circuit for the above part (iii)