SINGAPORE POLYTECHNIC

2019/2020 S1 **/ SEMESTRAL EXAMINATIONS**

MODULE NAME: DIGITAL ELECTRONICS **MODULE CODE:** ET1003

SET BY: _____

COURSE: DASE/DCPE/DEB/DCEP/DEEE/DARE/DBEN/DME/DMRO YEAR: 1 FT

NO	SOLUTION	Marks	Total Marks
	MCQ		
	2 marks each		
	A1. b		
	A2. c		
	A3 d		
	A4. a		
	A5. c		
	A6 c		
	A7. b		
	A8. b		
	A9. c		
	A10. a		
			20

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NO	SOLUTION	Marks	Total Marks
B1.			
	$1\ 0\ 2\ 1_{10}$		
(a)			
	512 | 256 128 64 | 32 16 8 | 4 2 1	5	
	1 | 1 1 1 | 1 1 1 | 1 0 1		
	1 | 7 | 7 | 5_8		
(b)		5	
	$0001\ \ 1001\ \ 0110\ \ 0011_{BCD}$		
	$1\ \ 9\ \ 6\ \ 3_{10}$		
(c)	E C A D	5	
	1110 1100 1010 1101_2		
			15

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NO	SOLUTION	Marks	Total Marks
B2			
(a)	$\overline{A \oplus B} + BC$ OR $\overline{\overline{A}B + A\overline{B}} + BC$	5	
	OR $\overline{A}\overline{B} + AB + BC$		
	OR other acceptable solutions		
(b)		10	

A	B	C	F
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

			15

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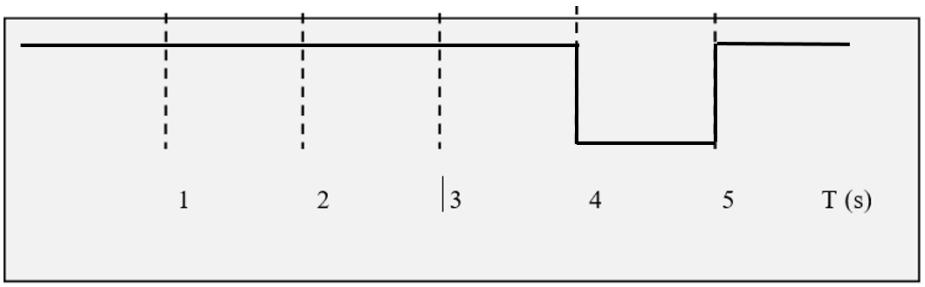
NO	SOLUTION	Marks	Total Marks
B3			
	$\overline{\overline{\overline{A}BC} + \overline{B}}$		
(a)			
	$= \overline{\overline{\overline{A}B} + \overline{C} + \overline{B}}$	5	
	$= \overline{\overline{A}B} + \overline{C} + \overline{B}$		
	$= \overline{A} + \overline{B} + \overline{C}$		
		10	
(b)	F 		

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NO	SOLUTION	Marks	Total Marks
B4			
		2	
(a)	7474		
(b)			
	74C74	2	
	$MOD=f_{clock}/f_{max}$		
(c)			
	=128khz/1khz	5	
	=128		
	1000/128 has remainder 104		
(d)			
	104+4	6	
	The count is 108		15

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NO	SOLUTION	Marks	Total Marks
C1 (a)		7	

Input				Output
D	C	B	A	Z
0	0	0	0	X
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	X
0	1	1	0	X
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	X
1	0	1	1	X
1	1	0	0	X
1	1	0	1	X
1	1	1	0	X
1	1	1	1	X

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NO	SOLUTION	Marks	Total Marks
(b)		5	

DC \ BA	$\overline{B}\,\overline{A}$	$\overline{B}A$	BA	$B\overline{A}$
$\overline{D}\,\overline{C}$	X	1	0	0
$\overline{D}C$	1	X	1	X
DC	X	X	X	X
$D\overline{C}$	0	1	X	X

Correct K-map - **3 marks**

Correct simplified logic expression - **2 marks**

$$F = C + \overline{B}A$$

(c) 3

$$F = \overline{\overline{C + \overline{B}A}}$$

$$= \overline{\overline{C}\,\overline{\overline{B}A}}$$

$$= \overline{\overline{C}\,\overline{\overline{B}}\,\overline{A}}$$

$$= C + B + \overline{A}$$

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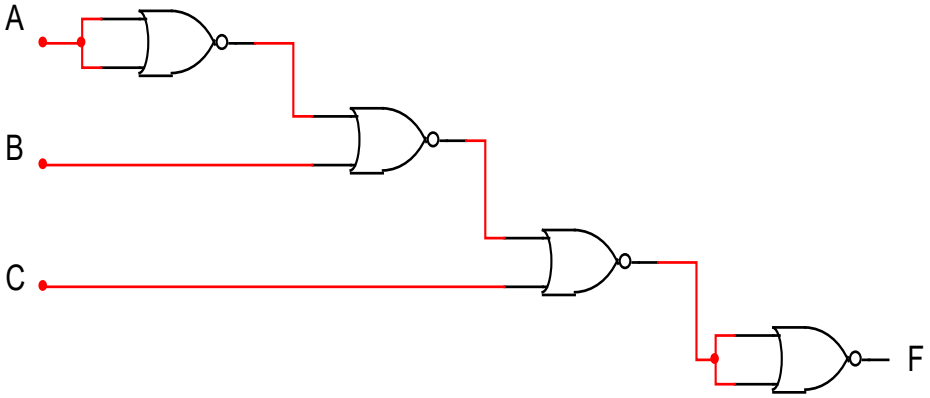
NO	SOLUTION	Marks	Total Marks
c			
		3	
	One IC - 74LS02	2	
			20

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