UTM UNIVERSITI TEKNOLOGI MALAYSIA
Faculty of Computing
RESEARCH UNIVERSITY

TEST 1 SEMESTER I 2015/2016

SUBJECT CODE	**:**	**SCSR 1013**
SUBJECT TITLE	**:**	**DIGITAL LOGIC**
YEAR/COURSE	**:**	**1 SCSR/SCSJ/SCSB/SCSV/SCSD**
TOTAL TIME	**:**	**1 HOUR 30 MINUTES**
DATE	**:**	**9 / 10 / 2015**
VENUE	**:**	**DK 7, N24, UTM SKUDAI**

(GENERAL INSTRUCTION):

Answer all questions from **Part A** and **B**.

This test will contribute 15% towards the total marks of 100 points.

Warning!

Students who are caught cheating during the Examination will be reported to disciplinary board for action to suspend the student for one or two semesters.

Name	
I/C No.	
Year/Course	**1 SCSR / SCSJ / SCSV / SCSB**
Section	**01/ 02/ 03/ 04/ 05/ 06/ 07/ 08/ 09**
Lecturer	**PM. Dr. Mazleena/ Dr. Foad / Dr. Raja Zahilah / Dr. Ismail/ Dr. Siti Hajar / Dr. Murtadha / Mr. Muhalim/ Mr. Firoz/ Ms. Marina**

This paper contains 11 pages including this cover page

PART A: 10 OBJECTIVE QUESTIONS [Total mark 20 points]

Answer all the questions. Read each statement carefully. Please answer in page 10 at the back of your question booklet.

1. Which is **NOT** an example of analog quantities?
   A. Time
   B. Pressure
   C. Energy
   D. Bandwidth

2. A quantity having discrete value is a _____ quantity.
   A. analog
   B. digital
   C. continuous
   D. natural

3. An analog-to-digital converter (ADC) converts _____ to _____.
   A. discrete signals, discrete digital numbers
   B. continuous signals, discrete digital numbers
   C. continuous signals, discrete analog numbers
   D. discrete signals, discrete analog numbers

4. Determining the number of passengers in a flight is the function of a _____.
   A. Comparator
   B. Encoder
   C. Counter
   D. Multiplexer

5. Which statement **CORRECTLY** describes a COMPARATOR function?
   A. Sending multiple inputs to a destination.
   B. Converting a key press on a keypad to a BCD function.
   C. Determine whether a car exceeds the speed limit.
   D. Memorize characters type on a keyboard.

6. Arrange the complexity classifications for fixed-function ICs from **largest** to **smallest**.

   A. ULSI, VLSI, LSI, MSI, SSI

   B. SSI, MSI, LSI, VLSI, ULSI

   C. MSI, LSI, SSI, VLSI, ULSI

   D. VLSI, LSI, MSI, SSI, ULSI

7. Which statement is **NOT** the advantage of Programmable Logic Device (PLD)?

   A. More logic circuit can be 'stuffed' into much smaller area.

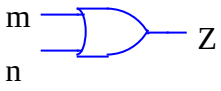
   B. Certain PLD design can be changed without rewiring or replacing components.

   C. A specific logic function is hardwired in the IC.

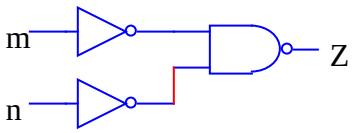
   D. Can be implemented faster once the required programming language is mastered.

8. Given input **m** is 1 and **n** is 1, determine which circuit has a different output, Z.

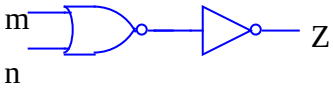
A



C



B



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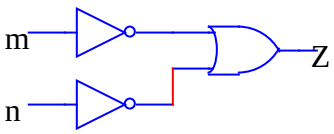
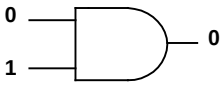
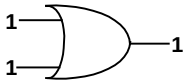


9. Which of the following operation of logic gates is **FALSE**?

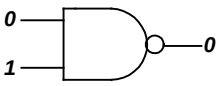
A.



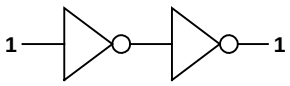
B.



C.



D.



10. Find all the possible values of the variables that makes Z=1.

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

i. A=0, B=0

ii. A=0, B=1

iii. A=1, B=0

iv. A=1, B=1

A. i, ii and iii

B. ii and iii

C. ii and iv

D. ii, iii and iv

PART B: 4 SUBJECTIVE QUESTIONS [Total mark 70 points]

Answer all the questions in this question paper.

Question 1 [20 Marks]

A digital system with periodic digital waveform has a pulse width, t_w, of 25µs and a period, T, of 150µs.

a) Convert the **period** to the unit of millisecond (ms). [4m]

b) How many **cycles** are there in 10ms? [4m]

c) What is the **frequency** of the system? [4m]

d) Calculate the **on** and **off** state of the system in µs. [4m]

e) Calculate the **duty cycle** of the system. [4m]

Question 2 [20 Marks]

a) Convert the following numbers to its **decimal** equivalent. [7m]

i. 1011_3

ii. $9E.A_{16}$

b) Convert the decimal number 122.63_{10} to its **binary** equivalent (to five radix points). [7m]

c) Convert 114.6_8 to its: [6m]

i. **binary** equivalent.

ii. **hexadecimal** equivalent.

Question 3 [25 Marks]

a) Convert the Gray Coded value **1001 1011** to its **binary** equivalent. [5m]

b) Perform the operation below using **8 bits 2's complement** where appropriate. Show all your works clearly. [8m]

i. 15 + 20

ii. 50 – 30

c) A system using **even** parity received the following ASCII hexadecimal value, **CCCF47C9C3$_{16}$ (**receives MSB first). By referring the ASCII table given in Appendix (refer Table 1 in Page 12), find the ***message*** by completing Table 2. [12m]

Table 2: ASCII to character conversion

Received ASCII data in hex	Received ASCII data in binary	Parity Bit	ASCII in binary	ASCII in Hex	ASCII Character

Question 4 [15 Marks]

a) Given the input waveform A and B in the logic circuit of Figure 1(a), draw the appropriate **output waveform** for X by filling the Figure 1(b). [9m]

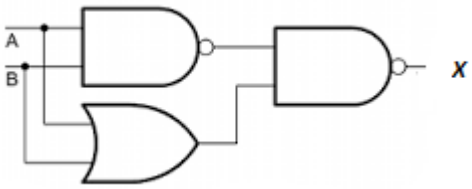


Figure 1(a): Logic circuit

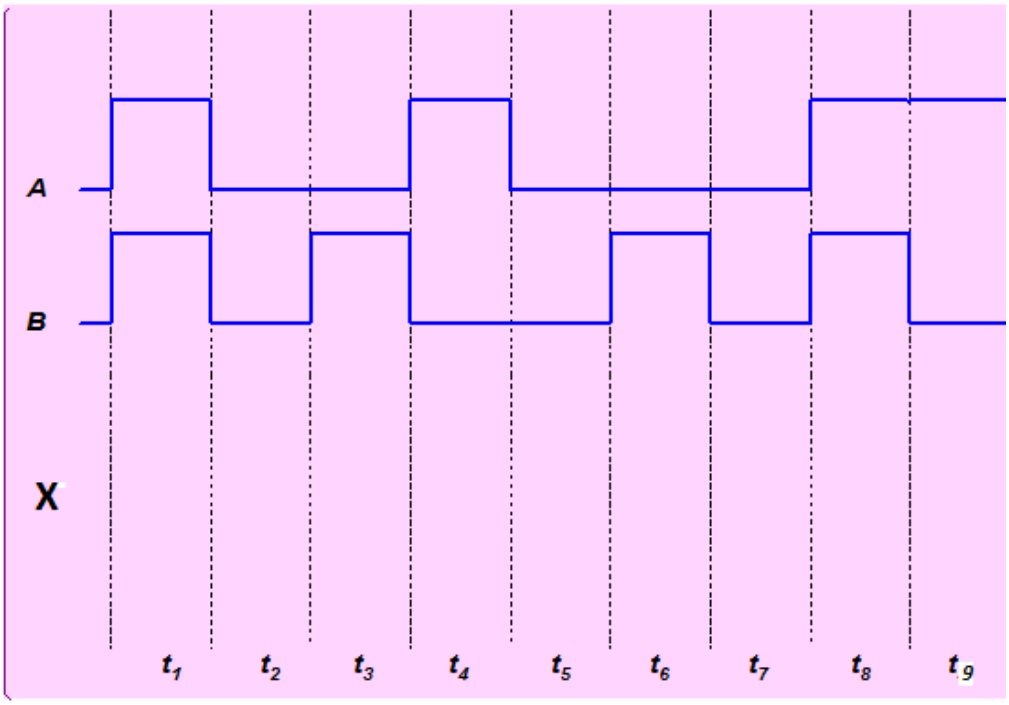


Figure 1(b): Output waveform of logic circuit in Figure 1(a)

b) Fill in the **truth table** of Table 3 below based on your answer in Question 4(a). [4m]

Table 3: Truth table

A	B	X
0	0	
0	1	
1	0	
1	1	

c) Which **single gate** does Table 3 represents [2m].

_____

ANSWER SHEET

Name	
I/C No.	
Lecturer	**PM. Dr. Mazleena/ Dr. Foad / Dr. Raja Zahilah / Dr. Ismail/ Dr. Siti Hajar / Dr. Murtadha / Mr. Muhalim/ Mr. Firoz/ Ms. Marina**

PART A (OBJECTIVE)

Mark your answer clearly.

Example: =A= =●= =C= =D=

1. =A= =B= =C= =D=

2. =A= =B= =C= =D=

3. =A= =B= =C= =D=

4. =A= =B= =C= =D=

5. =A= =B= =C= =D=

6. =A= =B= =C= =D=

7. =A= =B= =C= =D=

8. =A= =B= =C= =D=

9. =A= =B= =C= =D=

10. =A= =B= =C= =D=

APPENDIX

Table 1: ASCII Table

Decimal	Hex	ASCII	Decimal	Hex	ASCII	Decimal	Hex	ASCII	Decimal	Hex	ASCII
0	00	NUL	32	20	(blank)	64	40	@	96	60	`
1	01	SOH	33	21	!	65	41	A	97	61	a
2	02	STX	34	22	"	66	42	B	98	62	b
3	03	ETX	35	23	#	67	43	C	99	63	c
4	04	EOT	36	24	$	68	44	D	100	64	d
5	05	ENQ	37	25	%	69	45	E	101	65	e
6	06	ACK	38	26	&	70	46	F	102	66	f
7	07	BEL	39	27	'	71	47	G	103	67	g
8	08	BS	40	28	(	72	48	H	104	68	h
9	09	HT	41	29	)	73	49	I	105	69	i
10	0A	LF	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	48	30	0	80	50	P	112	70	p
17	11	DC1	49	31	1	81	51	Q	113	71	q
18	12	DC2	50	32	2	82	52	R	114	72	r
19	13	DC3	51	33	3	83	53	S	115	73	s
20	14	DC4	52	34	4	84	54	T	116	74	t
21	15	NAK	53	35	5	85	55	U	117	75	u
22	16	SYN	54	36	6	86	56	V	118	76	v
23	17	ETB	55	37	7	87	57	W	119	77	w
24	18	CAN	56	38	8	88	58	X	120	78	x
25	19	EM	57	39	9	89	59	Y	121	79	y
26	1A	SUB	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	60	3C	<	92	5C	\	124	7C	|
29	1D	GS	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	62	3E	>	94	5E	^	126	7E	~
31	1F	US	63	3F	?	95	5F	_	127	7F	(delete)