UTM UNIVERSITI TEKNOLOGI MALAYSIA
Faculty of Computing
RESEARCH UNIVERSITY

TEST 1 SEMESTER I 2016/2017

SUBJECT CODE	:	**SCSR 1013**
SUBJECT TITLE	:	**DIGITAL LOGIC**
YEAR/COURSE	:	**1 SCSR/SCSJ/SCSB/SCSV/SCSD**
TOTAL TIME	:	**1 HOUR 15 MINUTES**
DATE	:	**9 / 10 / 2016**
VENUE	:	**N28-MPK 1 – 6**

(GENERAL INSTRUCTION):

Answer all questions from **Part A** and **B** in this question booklet. For **Part B**, read the questions carefully and show **ALL** your works in details.

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	
Matric No.	
Year/Course	**1 SCSR / SCSJ / SCSV / SCSB/ SCSD**
Section	**01/ 02/ 03/ 04/ 05/ 06/ 07/ 08/ 09**
Lecturer	**Dr. Foad / Dr. Ismail/ Dr. Raja Zahilah / Mr. Muhalim/ Ms Rashidah/ Ms. Marina**

This paper contains 9 pages including this cover page

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

Answer all the questions. Read each statement carefully. Please answer in page 8.

1. Which of the following IC is **NOT** categorized as a Small Scale Integrated (SSI) IC?
   A) 7404 (hex inverters IC)
   B) 7408 (quad two-inputs AND gates IC)
   C) 7432 (quad two-inputs OR gates IC)
   D) 7483 (4-bit binary ADDER IC)

2. Electronic system that utilizes both analog and digital units is known as _____.
   A) unity system
   B) lateral system
   C) hybrid system
   D) separated system

3. The following symbol represents an "active LOW" device. What is the meaning of "active LOW" device?
   A) The output is always LOW.
   B) The input is always HIGH.
   C) The device will be activated if the input is LOW.
   D) The device will be activated if the input is HIGH.

4. Which of the following statements is **FALSE** about the usage of Medium Scale Integrated (MSI) IC function?
   A) A Multiplexer is used to send multiple inputs to a destination via single cable.
   B) A Decoder is used to count the number of visitors to an expo.
   C) A Comparator is used to determine whether a car has exceeded the speed limit.
   D) A Demultiplexer is used to route a different packet for a designated destination.

5. Which of the following is **NOT** an example of memory devices in digital system?
   A) Flash memory
   B) RAM memory
   C) ROM memory
   D) UPS battery

6. Programmable Logic Device (PLD) IC can be categorized into the following types **EXCEPT**

   A) SPLD (Simple Programmable Logic Device)
   B) CPLD (Complex Programmable Logic Device)
   C) FPGA (Field Programmable Gate Array)
   D) WPLD (Wired Programmable Logic Device

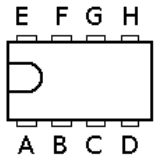
7. Which of the following Boolean Gates operations is **TRUE**?

   A) Output of the AND gate will be HIGH if all inputs are LOW
   B) Output of the OR gate will be LOW if all inputs are LOW
   C) Output of the AND gate will be LOW if all inputs are HIGH
   D) Output of the INVERTER gate will always be identical with the input state

8. Which of the following statements is **FALSE** about the characteristic of an analog or digital signal?

   A) Analog signal uses decimal base number
   B) Digital signal uses binary base number
   C) Analog signal always have continuous measurement value
   D) Digital signal conversion does not have quantization error

9. Which label indicates the position of **Pin 5** of the IC as shown below?



   A) Label A
   B) Label G
   C) Label H
   D) Label E

10. A digital-to-analog converter (DAC) converts _____ to _____.

   A) discrete signals, discrete digital numbers
   B) continuous signals, discrete analog numbers
   C) discrete digital numbers, continuous signals
   D) discrete signals, discrete analog numbers

11. Which one of the following is equivalent to 13_8.

A) 1011_2 C) D_{16}

B) 12_{10} D) A_7

12. Which one of the following is an **INVALID** hexadecimal number?

A) $5HA_{16}$ C) $BA5_{16}$

B) $FA1D_{16}$ D) 100_{16}

13. In _____ number system, there are five (5) valid digits.

A) base 10 C) base 4

B) base 5 D) base 2

14. 10011101_2 is equivalent to the numbers below, **EXCEPT**

A) 235_8 C) 157_{10}

B) $9D_{16}$ D) 335_6

15. Which one of the following numbers is **LARGER** than $34_{16.}$

A) 50_8 C) 101010_2

B) 125_{10} D) 60_8

16. Determine which of the following **EVEN** parity codes has error.

A) 01101100 C) 11100111

B) 10100001 D) 11111111

17. Which of the following number is **VALID** for BCD conversion?

A) 1234 C) BCDE

B) A678 D) 5H7C

18. Two Bytes of data is equal to the following **EXCEPT**

A) a word C) four nibbles

B) 16 bits D) two nibbles

19. Choose **-10_{10}** in sign & magnitude form (in 8-bit binary system):

A) 11110101 C) 10001010

B) 11111001 D) 10001011

20. Convert Gray code **11** to its equivalent binary number.

A) 00 C) 01

B) 10 D) 11

PART B: 4 SUBJECTIVE QUESTIONS [Total mark 35 points]

Answer all the questions in this question paper. Show ALL your works.

Question 1 [12 Marks]

a) List two (2) advantages of using digital system over analog system. [2m]

b) A square wave signal is generated with the following characteristics:

- Period = 10ms
- Duty Cycle = 75%
- Amplitude = 5V

Answer the following:

i) Calculate the frequency in MHz [3m]

ii) Calculate pulse width (t_w) [2m]

iii) Draw the waveform for 20 ms duration and label all the values.[3m]

c) List two (2) reasons why designing logic function circuit using Programming Logic Device (PLD) has more advantages compared to fixed IC device. [2m]

Question 2 [12 Marks]

a) Convert $\mathbf{258.7_{10}}$ to hexadecimal number. Give your answer in 2 radix points. [5m]

b) Convert $\mathbf{311.22_4}$ to its decimal equivalent. Give your answer in 2 radix points. [4m]

c) Convert $\mathbf{22.63_8}$ to its binary equivalent. Give your answer in 5 radix points. [3m]

Question 3 [5 Marks]

Refer to the Table 1 (ASCII Table) in the Appendix.

a) Convert characters, **Rs** to ASCII codes in hexadecimal form. [1m]

b) Rewrite the above answer with even parity added. Give the answer in hexadecimal form. [4m]

Question 4 [6 Marks]

Perform the arithmetic operation of the decimal numbers, **24 – 10** using 2's complement method. Use 8-bit binary system. Give your answer in decimal. [6m]

All the best!!! Show ALL your works.

ANSWER SHEET

Name	
Matric No.	
Lecturer	**Dr. Foad / Dr. Ismail/ Dr. Raja Zahilah / Mr. Muhalim/ Ms Rashidah/ Ms. Marina**

Objectives	**/20**
Question 1	**/12**
Question 2	**/12**
Question 3	**/5**
Question 4	**/6**
Total	**/55**

PART A (OBJECTIVE)

Mark your answer clearly.

Example: =A= =B= =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=

11. =A= =B= =C= =D=

12. =A= =B= =C= =D=

13. =A= =B= =C= =D=

14. =A= =B= =C= =D=

15. =A= =B= =C= =D=

16. =A= =B= =C= =D=

17. =A= =B= =C= =D=

18. =A= =B= =C= =D=

19. =A= =B= =C= =D=

20. =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)