Question 1 [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 2 [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

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)

TUTORIAL 2b

NAME : _____

STUDENT ID : _____ SECTION: _____

INSTRUCTIONS: Please answer all questions in the spaces given and show ALL your workings.

1. 2 bytes is equal to how many: [3m]
   a. Nibbles =
   b. Words =
   c. Bits =

2. Give ONE example of code in the digital systems. [1m]

3. Convert $\mathbf{90.3125_{10}}$ to

   a. Binary = [4m]

   b. Hexadecimal [2m]

4. Using 8-bits number system, change **-24** into its representation of:

   a. Sign and magnitude [2m]

   b. 1's complement [2m]

   c. 2's complement [1m]

5. Using 10-bits 2's complement signed numbers, perform the following operation.

   a. **24 + 16** [2m]

   b. **-90 - 16** [3m]

TUTORIAL 2c

1. Please write True [T] or False [F] for the following statements. [6m]

1	The smallest "unit" of data on a binary computer is a single byte	
2	2 Words = 8 nibble	
3	MSB is the leftmost bit.	
4	1001 is an invalid code in BCD	
5	Gray code is used to facilitate error correction in digital communications.	
6	Parity bit is append to the code at the rightmost position (LSB)	

2. Convert the following numbers to its decimal equivalent.

   a. $FE04_{16}$ [2m]

   b. 750_5 [2m]

3. Convert 9000_{10} to following number representations.

   a. hexacedimal number. [3m]

   b. binary number [1m]

4. Convert 564.45_{10} to following number representations. Give answer to 3 fractional point.

   a. binary number. [5m]

   b. hexadecimal number [1m]

      0010 0011 0100 . 0110

TUTORIAL 2c

5. Convert 2288 to: [1m]

   a. BCD

   b. Gray Code [2m]

1	0	0	0	1	0	1	0	0	0	1	0	0	0
1	1	0	0	1	1	1	1	0	0	1	1	0	0

6. What is the ASCII binary code for the character 'S' (53_H) using **odd** parity code. [2m]

7. Give reasons why -8 is **invalid** in the following 4 bits signed number representation:

   a. Sign and magnitude [2m]

   b. 1's complement [2m]

8. Perform the following operations using 8-bit 2's complement signed number.

   a. 24 – 17 [3m]

   b. -17 + 24 [3m]