

ID: 20i-1884

NAME: Muhammad Ahmed Baig

SECTION: B

Read the Instructions Carefully

- ❖ Base 3, base 4, base 5, base 6 means the one you used in QUESTION 1
- ❖ Your assigned number is given to you in excel sheet provided with assignment

FOR EXAMPLE: Assigned Number if your assigned number is **0821**

	Assign Digit 0	Assign Digit 1	Assign Digit 2	Assign Digit 3
Short for Assigned Digit	A0	A1	A2	A3
Write Assigned Number Digit By Digit	9	6	4	1

FOR EXAMPLE: Name is **HAMAZADAUD**

- ❖ Use your name instead of HAMZA
- ❖ If your name starts with MUHAMMAD kindly use your second name
- ❖ Convert repeated character to small letter or to other symbols to make them unique (see example for A, a & @)

	ZERO CHARACTER OF YOUR NAME	FIRST CHARACTER OF YOUR NAME	SECOND CHARACTER OF YOUR NAME	THIRD CHARACTER OF YOUR NAME	FOURTH CHARACTER OF YOUR NAME	FIFTH CHARACTER OF YOUR NAME	SIXTH CHARACTER OF YOUR NAME
Short for CHARACTER	C0	C1	C2	C3	C4	C5	C6
YOUR NAME CHARACTER BY CHARACTER	A	H	M	E	D	B	a

1. Fill the table given below and Count in given base

NOTE: Use Assigned number & Your Name

- **Base 3** (Zero Digit is Assign0 (**A0**), First Digit is Assign1 (**A1**), Second Digit is Assign2 (**A2**))
- **Base 4** (Zero Digit is Assign0 (**A0**), First Digit is Assign1 (**A1**), Second Digit is Assign2 (**A2**), and Third Digit is Assign3 (**A3**))
- **Base 5** (Zero Digit is Character0 (**C0**) of your name, First Digit is Character1 (**C1**) of your name, Second Digit is Character2 (**C2**) of your name, Third Digit is Character3 (**C3**) of your name, Four Digit is Character4 (**C4**) of your name)
- **Base 6** (Zero Digit is Character0 (**C0**) of your name, First Digit is Character1 (**C1**) of your name, Second Digit is Character2 (**C2**) of your name, Third Digit is Character3 (**C3**) of your name, Four Digit is Character4 (**C4**) of your name and Fifth Digit is Character5 (**C5**) of your name)

TABLE

BASE 10 DECIMAL	BASE 2 BINARY	BASE 3	BASE 4	BASE 5	BASE 6	BASE 8 OCTAL	BASE 16 HEXA
0	0	9	9	A	A	0	0
1	1	6	6	H	H	1	1
2	10	4	4	M	M	2	2
3	11	69	1	E	E	3	3
4	100	66	69	D	D	4	4
5	101	64	66	HA	B	5	5
6	110	49	64	HH	HA	6	6
7	111	46	61	HM	HH	7	7
8	1000	44	49	HE	HM	10	8
9	1001	699	46	HD	HE	11	9
10	1010	696	44	MA	HD	12	A
11	1011	694	41	MH	HB	13	B
12	1100	669	19	MM	MA	14	C
13	1101	666	16	ME	MH	15	D
14	1110	664	14	MD	MM	16	E
15	1111	649	11	EA	ME	17	F
16	10000	646	699	EH	MD	20	10
17	10001	644	696	EM	MB	21	11
18	10010	499	694	EE	EA	22	12
19	10011	496	691	ED	EH	23	13
20	10100	494	669	DA	EM	24	14

BASE 10	BASE 2 BINARY	BASE 3	BASE 4	BASE 5	BASE 6	BASE 8 OCTAL	BASE 16 HEXA
21	10101	469	666	DH	EE	25	15
22	10110	466	664	DM	ED	26	16
23	10111	464	661	DE	EB	27	17
24	11000	449	649	DD	DA	30	18
25	11001	446	646	HAA	DH	31	19
26	11010	444	644	HAH	DM	32	1A
27	11011	6999	641	HAM	DE	33	1B
28	11100	6996	619	HAE	DD	34	1C
29	11101	6994	616	HAD	DB	35	1D
30	11110	6969	614	HHA	BA	36	1E
31	11111	6966	611	HHH	BH	37	1F
32	100000	6964	499	HHM	BM	40	20
33	100001	6949	496	HHE	BE	41	21
34	100010	6946	494	HHD	BD	42	22
35	100011	6944	491	HMA	BB	43	23
36	100100	6699	469	HMH	HAA	44	24
37	100101	6696	466	HMM	HAH	45	25
38	100110	6694	464	HME	HAM	46	26
39	100111	6669	461	HMD	HAE	47	27
40	101000	6666	449	HEA	HAD	50	28
41	101001	6664	446	HEH	HAB	51	29
42	101010	6649	444	HEM	HHA	52	2A
43	101011	6646	441	HEE	HHH	53	2B
44	101100	6644	419	HED	HHM	54	2C
45	101101	6499	416	HDA	HHE	55	2D
46	101110	6496	414	HDH	HHD	56	2E
47	101111	6494	411	HDM	HHB	57	2F
48	110000	6469	199	HDE	HMA	60	30
49	110001	6466	196	HDD	HMH	61	31
50	110010	6464	194	MAA	HMM	62	32

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BSCS-B
9641

DLD ASSIGNMENT

Question No. 2

$$\bullet (25)_{10} = (?)_3$$

$$\begin{array}{r} 3 \\ \hline 3 | 25 - 1 \\ \hline 3 | 8 - 2 \\ \hline 2 - 2 \end{array} \quad (221)_3 \Rightarrow (446)_3$$

$$\bullet (32)_{10} = (?)_4$$

$$\begin{array}{r} 4 \\ \hline 4 | 32 - 0 \\ \hline 4 | 8 - 0 \\ \hline 2 - 2 \end{array} \quad (200)_4 \Rightarrow (499)_{10}$$

$$\bullet (41)_{10} = (?)_5$$

$$\begin{array}{r} 5 \\ \hline 5 | 41 - 1 \\ \hline 5 | 8 - 3 \\ \hline 1 - 1 \end{array} \quad (131)_5 \Rightarrow (\text{HEH})_5$$

$$\bullet (49)_{10} = (?)_6$$

$$\begin{array}{r} 6 \\ \hline 6 | 49 - 1 \\ \hline 6 | 8 - 2 \\ \hline 1 - 1 \end{array} \quad (121)_6 \Rightarrow (\text{HMH})_6$$

9 - 0
6 - 1
4 - 2
1 - 3

A - 0
H - 1
M - 2
E - 3
D - 4
B - 5

Question No. 3

9^0
 6^1
 4^2
 1^3

• $(9641)_{10} = (?)_3$

$$\begin{array}{r} 3 \mid 9641 - 2 \\ 3 \mid 3213 - 0 \\ 3 \mid 10071 - 0 \\ 3 \mid 3357 - 3 \\ 3 \mid 1119 - 2 \\ 3 \mid 39 - 0 \\ 3 \mid 13 - 1 \\ 3 \mid 4 - 1 \\ 3 \mid 1 - 1 \\ \hline & 1 \end{array}$$

$$(9641)_{10} = \boxed{(11\overset{10}{0}120002)_3}$$

$$= \boxed{\cancel{(11010120001)} + (666949994)_3}$$

check:

$$(2 \times 3^0) + (0 \times 3^1) + (0 \times 3^2) + (0 \times 3^3) +$$

$$(2 \times 3^4) + (0 \times 3^5) + (1 \times 3^6) + (1 \times 3^7)$$

$$+ (1 \times 3^8)$$

$$= (9641)_{10}$$

• $(9641)_{10} = (?)_4$

$$\begin{array}{r} 4 \mid 9641 - 1 \\ 4 \mid 2410 - 2 \\ 4 \mid 602 - 2 \\ 4 \mid 150 - 2 \\ 4 \mid 37 - 1 \\ 4 \mid 9 - 1 \\ 4 \mid 2 - 2 \\ \hline & 1 \end{array}$$

$$(9641)_{10} = \boxed{(2112221)_4}$$

check

$$(1 \times 4^0) + (2 \times 4^1) + (2 \times 4^2) + (2 \times 4^3) + (1 \times 4^4)$$

$$+ (1 \times 4^5) + (2 \times 4^6)$$

$$= (9641)_{10}$$

• $(\cancel{9641})_{10} = (?)_5$

$$\begin{array}{r} 5 \mid 9641 - 1 \\ 5 \mid 1928 - 3 \\ 5 \mid 385 - 0 \\ 5 \mid 77 - 2 \\ 5 \mid 15 - 0 \\ 5 \mid 3 - 3 \\ \hline & 3 \end{array}$$

$$(9641)_{10} = \boxed{(302031)_5} = \boxed{\cancel{1049678}}$$

$$(1 \times 5^0) + (3 \times 5^1) + (0 \times 5^2) + (2 \times 5^3)$$

$$+ (0 \times 5^4) + (3 \times 5^5)$$

$$= (9641)_{10}$$

$$= \boxed{(\text{EAMAEH})_5}$$

- $(9641)_{10} = (?)_6$

$$\begin{array}{r} 6 | 9641 - 5 \\ \hline 6 | 1606 - 4 \\ \hline 6 | 267 - 3 \\ \hline 6 | 44 - 2 \\ \hline 6 | 7 - 1 \\ \hline 6 | 1 - 1 \\ \hline 1 \end{array}$$

$$= \boxed{(HHMEDB)_6}$$

$$(9641)_{10} = \boxed{(112345)_6}$$

check:

$$(5 \times 6^0) + (4 \times 6^1) + (3 \times 6^2) + (2 \times 6^3) \\ + (1 \times 6^4) + (1 \times 6^5) \\ = (9641)_{10}$$

Question No. 4

- $(0.41)_{10} = (?)_3$

$$0.41 \times 3 = \underline{1.23} \rightarrow 1$$

$$0.23 \times 3 = \underline{0.69} \rightarrow 0$$

$$0.69 \times 3 = \underline{2.07} \rightarrow 2$$

$$0.07 \times 3 = \underline{0.21} \rightarrow 0$$

@.

$$= \boxed{(0.6949)_3}$$

$$(0.41)_{10} = \boxed{(0.1020)_3}$$

check

$$(0 \times 3^0) \cdot (1 \times 3^1) + (0 \times 3^2) + (\cancel{2} \times 3^3) \\ + (0 \times 3^4)$$

$$= (0.41)_{10}$$

- $(0.41)_{10} = (?)_4$

$$0.41 \times 4 = \underline{1.64} \rightarrow 1$$

$$0.64 \times 4 = \underline{2.56} \rightarrow 2$$

$$0.56 \times 4 = \underline{2.24} \rightarrow 2$$

$$0.24 \times 4 = \underline{0.96} \rightarrow 0$$

$$(0.41)_{10} = \boxed{(0.1220)_4}$$

check

$$(0 \times 4^0) \cdot (1 \times 4^{-1}) + (2 \times 4^{-2}) \\ + (2 \times 4^{-3}) + (0 \times 4^{-4})$$

$$= (0.41)_{10}$$

$$= \boxed{(0.6449)_4}$$

$$\bullet (0.41)_{10} = (?)_5$$

$$0.41 \times 5 = \underline{2.05} \rightarrow 2$$

$$0.05 \times 5 = \underline{0.25} \rightarrow 0$$

$$0.25 \times 5 = \underline{1.25} \rightarrow 1$$

$$0.25 \times 5 = \underline{1.25} \rightarrow 1$$

$$(0.41)_{10} = \boxed{(0.2011)_5}$$

check
 $(0 \times 5^0) \cdot (2 \times 5^{-1}) + (0 \times 5^{-2}) + (1 \times 5^{-3}) + (1 \times 5^{-4})$

$$= (0.41)_{10}$$

$$\boxed{(A.MAHH)_5}$$

$$\bullet (0.41)_{10} = (?)_6$$

$$0.41 \times 6 = \underline{2.46} \rightarrow 2$$

$$0.46 \times 6 = \underline{2.76} \rightarrow 2$$

$$0.76 \times 6 = \underline{4.56} \rightarrow 4$$

$$0.56 \times 6 = \underline{3.36} \rightarrow 3$$

$$(0.41)_{10} = \boxed{(b.2243)_6}$$

check

$$(0 \times 6^0) \cdot (2 \times 6^{-1}) + (2 \times 6^{-2}) + (4 \times 6^{-3}) + (3 \times 6^{-4})$$

$$= (0.41)_{10}$$

$$\boxed{(A.MMDE)_6}$$

Question No. 5

$$\bullet (666949994)_3 + (69646496)_3$$

$$\begin{array}{r} 666949994 \\ + 69646496 \\ \hline 66694646984 \end{array}$$

$$= (666946469)_3$$

$$\bullet (4664446)_4 + (196)_4$$

$$\begin{array}{r} 4664446 \\ + 196 \\ \hline 4661644 \end{array}$$

$$= (4661644)_4$$

$$\bullet (EAMAEH)_5 + (HMA)_5$$

EAMAEH.

HMA

EAMMAAH

$$= (EAMMAAH)_5$$

$$\bullet (HHMEDB)_6 + (DA)_6$$

HHMEDB

DA

HHMDMB

$$= (HHMDMB)_6$$

Question No. 6

$$\bullet (666949994)_3 - (6496)_3$$

$$\begin{array}{r} 666949994 \\ - 6496 \\ \hline 666966696 \end{array}$$

$$= (666966696)_3$$

$$\bullet (4664446)_4 - (196)_4$$

$$\begin{array}{r} 4664446 \\ - 196 \\ \hline 44666149 \end{array}$$

$$= (4666149)_4$$

$$\begin{aligned}
 & (EAMAEH)_5 + (HMA)_5 \\
 - & \begin{array}{r} EAMAEH \\ HMA \\ \hline EAHDHH \end{array} \\
 = & (EAHDHH)_5
 \end{aligned}$$

$$\begin{aligned}
 & (HHMEDB)_6 - (DAX)(HMM)_6 \\
 - & \begin{array}{r} HHMEDB \\ DAXHMM \\ \hline HHMMME \end{array} \\
 = & (HHMMME)_6
 \end{aligned}$$

Question No. 7

$$\begin{aligned}
 & (666494446)_3 = (111020002)_3 \quad (3's) \\
 & \text{3's complement (R-1)'s} \quad (R-1)'s \text{ complement (R's)} \\
 & \begin{array}{r} 222222220^2 \\ - 111020002 \\ \hline 111202220 \end{array} \\
 & = (666494446)_3 \\
 & (46646446)_4 = (2112221)_4 \\
 & \text{3's complement (R-1)'s} \quad 4's \text{ complement (R's)} \\
 & \begin{array}{r} 3333333 \\ - 2112221 \\ \hline 1221112 \end{array} \\
 & = (6446661)
 \end{aligned}$$

$$\begin{array}{r} \cancel{(EAMAEH)}_5 = (302031)_5 \\ \text{5's complement} \\ \begin{array}{r} 444444 \\ - 302031 \\ \hline 253524 \end{array} \\ \hline \end{array}$$

$$\begin{array}{r} \cancel{(EBEBMD)}_5 = (253524)_5 \\ \text{6's complement} \\ \begin{array}{r} 253524 \\ - 142413 \\ \hline 111111 \end{array} \\ \hline \end{array}$$

A	b
H	21
M	22
E	23
D	24
B	25
a	26

$$= (\cancel{EBEBMD})_5$$

$$\begin{array}{r} \bullet (EAMAEH)_5 = (302031)_5 \\ \text{4's complement} \\ \begin{array}{r} 444444 \\ - 302031 \\ \hline 142413 \end{array} \\ \hline \end{array}$$

$$\begin{array}{r} \text{5's complement: } (R)'s \\ 142413 \\ + 111111 \\ \hline 142414 \\ \hline \end{array}$$

$$= (\cancel{HDMDBHD})_5$$

$$\begin{array}{r} \bullet (HHMEDB)_6 = (112345)_6 \\ \text{5's complement} \\ \begin{array}{r} 555555 \\ - 112345 \\ \hline 443210 \end{array} \\ \hline \end{array}$$

$$\begin{array}{r} \text{6's complement: } (R)'s \\ 443210 \\ + 111111 \\ \hline 443211 \\ \hline \end{array}$$

$$= (\cancel{DDEMHA})_6$$

Question No. 8

- $(649)_3 - (R-1)$'s of $(9641)_3$

$$\begin{array}{r}
 & \text{6664944449} \\
 & \text{⑥⑥} \\
 & \text{6664944449} \\
 + & \text{649} \\
 \hline
 & \text{666469669} \\
 & \text{2222222222} \\
 - & \underline{\text{111210110}} \\
 & \underline{\text{111012112}}
 \end{array}
 \rightarrow = -(666964664)_{\text{3}}$$

- $(646)_4 - (R-1)$'s of $(9641)_4$

$$\begin{array}{r}
 & \text{6446661} \\
 & \text{⑥⑥} \\
 + & \text{646} \\
 \hline
 & \text{6446199}
 \end{array}
 \rightarrow = 1221300$$

$$\begin{array}{r}
 & \text{33333333} \\
 - & \text{1221300} \\
 \hline
 & \text{2112033}
 \end{array}
 \rightarrow = -(4664911)_4$$

- $(HHE)_5 - (R-1)$'s of ~~(AHMED)~~

$$\begin{array}{r}
 & \text{HDMDHE} \\
 & \text{⑤⑤} \\
 + & \text{HHE} \\
 \hline
 & \text{HDEAEH}
 \end{array}
 \rightarrow = 143031$$

$$\begin{array}{r}
 & \text{444444} \\
 - & \text{143031} \\
 \hline
 & \text{301413}
 \end{array}
 \rightarrow = -(EAHDHE)_5$$

- $(\text{HAH})_6 - (\text{R}-1)\text{s of } (\text{AHMEDB})_6$

$$\begin{array}{r}
 \text{DDEMHA} \\
 + \frac{\text{HAH}}{\text{DD EEEHH}} \\
 \hline
 \end{array}
 \rightarrow 443311 = -(\text{HHMMDD})_6$$

Question No. 9

- $(666)_3 - (\text{R})\text{s of } (9641)_3$

$$\begin{array}{r}
 666494446 \\
 + \frac{666}{666469694} \\
 \hline
 \end{array}
 \rightarrow 111210102 = - (66694646)_3$$

- $(696)_4 - (\text{R})\text{s of } (9641)_4$

$$\begin{array}{r}
 644661 \\
 + \frac{696}{644449} \\
 \hline
 333333 \\
 - \frac{122220}{211113} \\
 \hline
 \end{array}
 \rightarrow 122220 = - (466649)_4$$

- $(DE)_5 - (R)$'s of $(AHMED)_5$

$$\begin{array}{r}
 \text{H D E A H M} \\
 \text{H H H} \\
 \text{H D H D H D} \\
 + \frac{\text{D E}}{\text{H D E A H M}} \rightarrow 143012 \\
 \hline
 444444 \\
 - 143012 \\
 \hline
 301432 \\
 + \frac{1}{301433} \rightarrow -(EAHDEE)_5
 \end{array}$$

- $(I+HM)_6 - (R)$'s of $(AHMEDB)_6$

$$\begin{array}{r}
 \text{D D E M H H} \\
 \text{H H M} \\
 + \frac{\text{D D E E M . E}}{\text{D D E E M . E}} \rightarrow 144332\cancel{3}4 \\
 \cancel{443321} \\
 \cancel{4411111} \\
 - \frac{5555555}{443324} \\
 \hline
 112231 \\
 + \frac{1}{112232} \rightarrow -(HHMMEM)_6
 \end{array}$$

Question No. 10

- $(9641) + (1369)$ in BCD

$$\begin{array}{r}
 9641 \\
 1369 \\
 \hline
 11010
 \end{array}
 \quad
 \begin{array}{r}
 1001 & 0010 & 0100 & 0001 \\
 0001 & 0011 & 0110 & 1001 \\
 \hline
 0000 & 1010 & 1001 & 0101
 \end{array}
 \quad
 \begin{array}{r}
 0110 \\
 \hline
 0001 & 0000 & 1010 & 0001 & 0000
 \end{array}
 \quad
 \begin{array}{r}
 = 0001 & 0000 & 0000 & 0001 & 0000
 \end{array}$$

Question No. 11

- $(9641) - (999)$ in BCD

$$\begin{array}{r}
 9641 \\
 999 \\
 \hline
 8642
 \end{array}
 \quad
 \begin{array}{r}
 1001 & 2010 & 2020 & 2000 \\
 1001 & 1001 & 1001 & 1001 \\
 \hline
 1000 & 1000 & 1010 & 1000
 \end{array}
 \quad
 \begin{array}{r}
 0110 & 0110 & 0110 \\
 \hline
 1000 & 0110 & 0100 & 0010
 \end{array}
 \quad
 \begin{array}{r}
 = 1000 & 0110 & 0100 & 0010
 \end{array}$$

Question No. 12

$(9641)_{10}$ to next 3 Gray Code

$(9641)_{10}$ Binary = 1001011010100
Gray code = 1101110111101

$(9642)_2$ Binary = 10010110101010
Gray code = 1101110111111

$(9643)_3$ Binary = 10010110101011
Gray code = 1101110111110

Question No. 13

Gray Code = 11011101111101

Binary = 10010110101001

Gray code = 11011101111111

Binary = 10010110101010

Gray code = 11011101111110

Binary = 10010110101011

Question No. 14 (Q3HHA) To solve (81) + (39)

- $(41)_{10} \times (17)_{10}$

$$\begin{array}{r} 41 \\ \times 17 \\ \hline 287 \\ 41 \\ \hline 697 \end{array}$$

$$= (697)_{10}$$

- $(15)_3 \times (5)_3$

- 619

$$\begin{array}{r} 64 \\ \hline 6964 \\ 6499 \\ \hline 4469 \end{array}$$

$$= (4469)_3$$

- $A3 = 1$

$$= (001)_2$$

$$\begin{array}{r} 001.011 \\ 101.011 \\ \hline 000 \\ 001 \quad 011 \\ \hline 000 \\ 000 \quad 010 \quad 110 \\ \hline 000 \\ 000 \quad 000 \quad 000 \\ \hline 001 \quad 011 \quad 000 \\ 000 \quad 000 \quad 000 \quad 000 \\ \hline 001 \quad 011 \quad 000 \quad 000 \\ \hline 00111,011001 \end{array}$$

$$\therefore (00111,011001)_2$$

Question No. 15

$$(96)_{10} \div (3)_{10}$$

$$\begin{array}{r}
 \overset{3}{\overline{)196}} \\
 \underline{-9} \downarrow \\
 \underline{\underline{6}} \\
 \underline{\underline{6}} \\
 0
 \end{array}
 = 32$$

$$A0A1 = 96$$

$$(96)_2 = (1100000)$$

$$\begin{array}{r} \overline{100000} \\ \overline{1100000} \\ \overline{11\downarrow\downarrow\downarrow\downarrow\downarrow} \\ \overline{000010} \end{array} = 100000$$