ASSIGNMENT ON COMPUTER ORGANIZATION AND ARCHITECTURE
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Q1.*State Moore's Law?*

Answer :- Moore's Law is the observation made in 1965 by Gordon Moore, co-founder of Intel, that the number of transistors per square inch on integrated circuits had doubled every year since the integrated circuit was invented.

Moore predicted that this trend would continue for the foreseeable future. In subsequent years, the pace slowed down a bit, but data density has doubled approximately every 18 months, and this is the current definition of Moore's Law, which Moore himself has blessed. Most experts, including Moore himself, expect Moore's Law to hold true until 2020-2025.

Q2. Specify the various generations of computer technology?

Answer :-There are five generations of computer technology and they are -

First Generation Of Computers (1942-1955)

The first generation computers were used during 1942-1955. They were based on **vacuum tubes**. Examples of first generation computers are **ENIVAC** and **UNIVAC-1.**

Advantages :-

1.Vacuum tubes were the only electronic component available during those days.
2.These computers could calculate data in millisecond.

Disadvantages :-

1.The computers were very large in size.
2.They consumed a large amount of energy.

Second Generation Computers (1955-1964)

The second generation computers used transistors

Advantages :-

1.Smaller in size as compared to the first generation computers.
2.Used less energy and were not heated.

Disadvantages :-

1.Cooling system was required.
2.Only used for specific purposes.

Third Generation Computers (1964-1975)

The Third generation computers used the integrated circuits (IC).

Advantages :-

1.Smaller in size as compared to previous generations.
2.Produced less heat as compared to the previous two generations of computers.

Disadvantages :-

1.Air conditioning was required.
2.Highly sophisticated technology required for the manufacturing of IC chips.

Fourth Generation Computers (1975-Present)

The fourth generation computers started with the invention of the Microprocessor. The Microprocessor contains thousands of ICs.

Advantages :-

1.More powerful and reliable than previous generations.
2.Small in size.

Disadvantages :-

The latest technology is required for manufacturing of Microprocessors.

Fifth Generation Computers (Present & Beyond)

Scientists are working hard on the 5th generation computers with quite a few breakthroughs. It is based on the technique of Artificial Intelligence (AI).Computers can understand spoken words & imitate human reasoning. Can respond to its surroundings using different types of sensors. Scientists are constantly working to increase the processing power of computers. They are trying to create a computer with real IQ with the help of advanced programming and technologies. IBM Watson computer is one example that outsmarts Harvard University Students. The advancement in modern technologies will revolutionize the computer in future.

Q3.*Convert the following decimal numbers to base 3, base 5, base 8, and base 16: 245, 461, 76.5, 46.45, 232.78, 1023.25.*

Answer:-

Base 3

3	245 — 2
3	81 — 0
3	27 — 0
3	9 — 0
3	3 — 0
	1

$(100002)_3$

3	461 — 2
3	153 — 0
3	51 — 0
3	17 — 2
3	5 — 2
	1

$(122002)_3$

3	76 — 1
3	25 — 1
3	8 — 2
	2

.5×3
X.5×3
X.5

$(2211)_3$

$(2211.111)_3$

46.45

3	46 — 1
3	15 — 0
3	5 — 2
	1

.45×3
X.35×3
X.05

$(1201.110)_3$

232.78

3	232 — 1
3	77 — 2
3	25 — 1
3	8 — 2
	2

.78×3
X.34×3
X.02
0.06

22121.210

1023.25

3	1023 — 0
3	341 — 2
3	113 — 2
3	37 — 1
3	12 — 0
3	4 — 1
	1

$(1101220.02)_3$

0.25×3
0.75
X.25

Base 5

245

5 | 245 — 0
5 | 49 — 4
5 | 9 — 4
1

$(1440)_5$

461

5 | 461 — 1
5 | 92 — 2
5 | 18 — 3
3

$(3321)_5$

76.5

5 | 76 — 1
5 | 15 — 0
3

0.5×5
2.5

$(301.22)_5$

46.45

5 | 46 — 1
5 | 9 — 4
1

0.45×5
2.25×3
1.25

$(141.21)_5$

232.78

5 | 232 — 2
5 | 46 — 1
5 | 9 — 4
1

0.78×5
3.9×5
4.5×5

$(1412.34)_5$

1023.25

5 | 1023 — 3
5 | 24 — 4
4

$.25 \times 5$
1.25×5

$(4043.11)_5$

Base 8

245

8 | 245 – 5
8 | 30 – 6
3

$(365)_8$

461

8 | 461 – 5
8 | 57 – 1
7

$(715)_8$

76.5

8 | 76 – 4
8 | 9 – 1
1

.5 × 8
4.0

$(114.4)_8$

46.45

8 | 46 – 6
5

.45 × 8
3.6 × 8
4.8 × 8

$(56.34)_8$

232.78

8 | 232 – 0
8 | 29 – 5
3

.78 × 8
6.24 × 8
1.92 × 8

$(350.61)_8$

1023.25

8 | 1023 – 7
8 | 127 – 7
8 | 15 – 7
1

0.25 × 8
2

$(1777.2)_8$

Base 16

245

16 | 245 – 5
15 = f

$(f5)_{16}$

461

16 | 461 – 13 = D
16 | 28 – C
1

$(1CD)_{16}$

76.5

16 | 76 – C
4

.5 × 16

$(4C.8)_{16}$

46.45

16 | 46 – E
2

.45 × 16
7.2

$(2E.7)_{16}$

232.78

16 | 232 – 8
14

.78 × 16
12.48 × 16
0.48 × 16
7.68

$(E8.C7)_{16}$

1023.25

16 | 1023 – f
16 | 63 – f
3

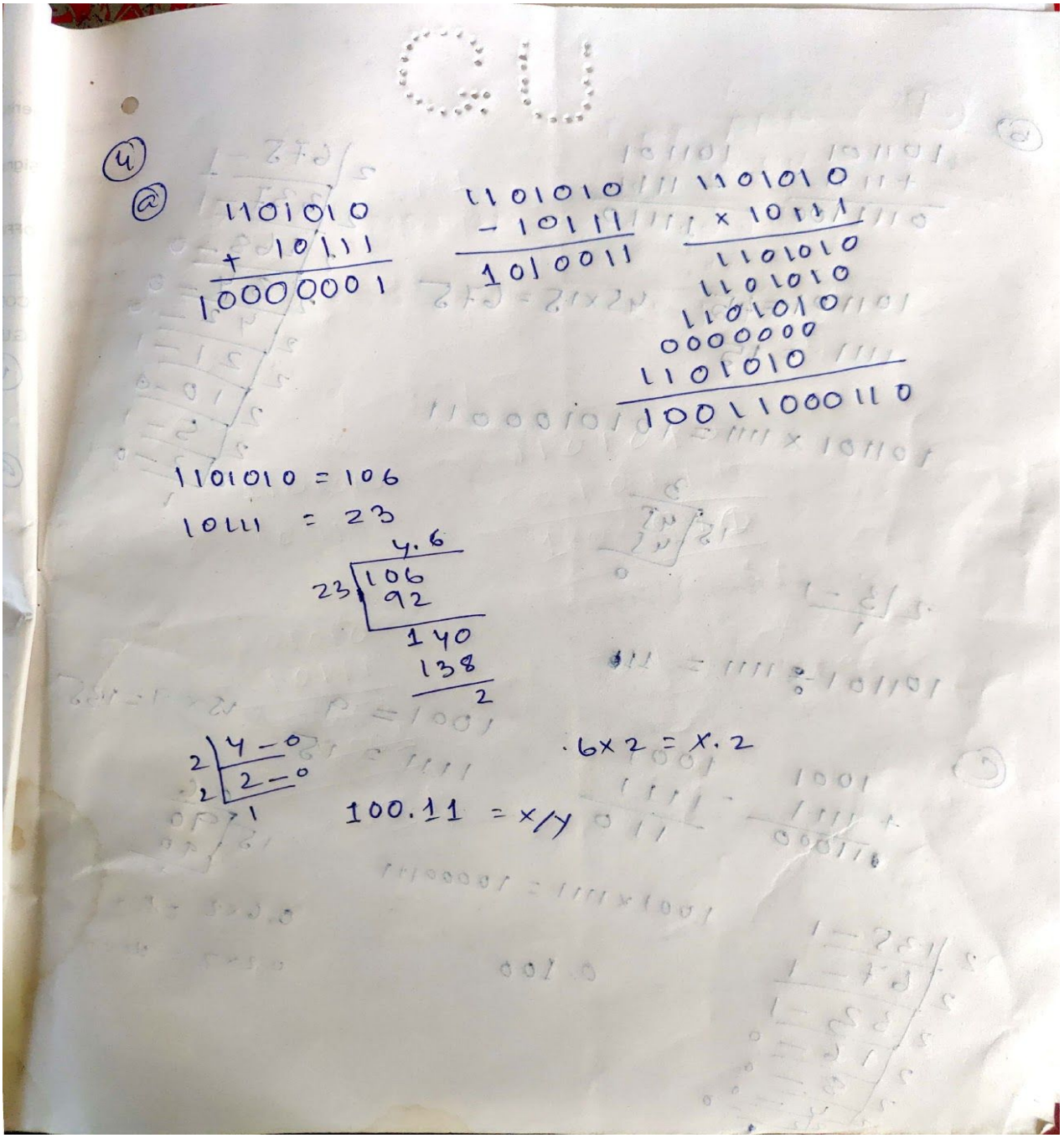
.25 × 16
= 4

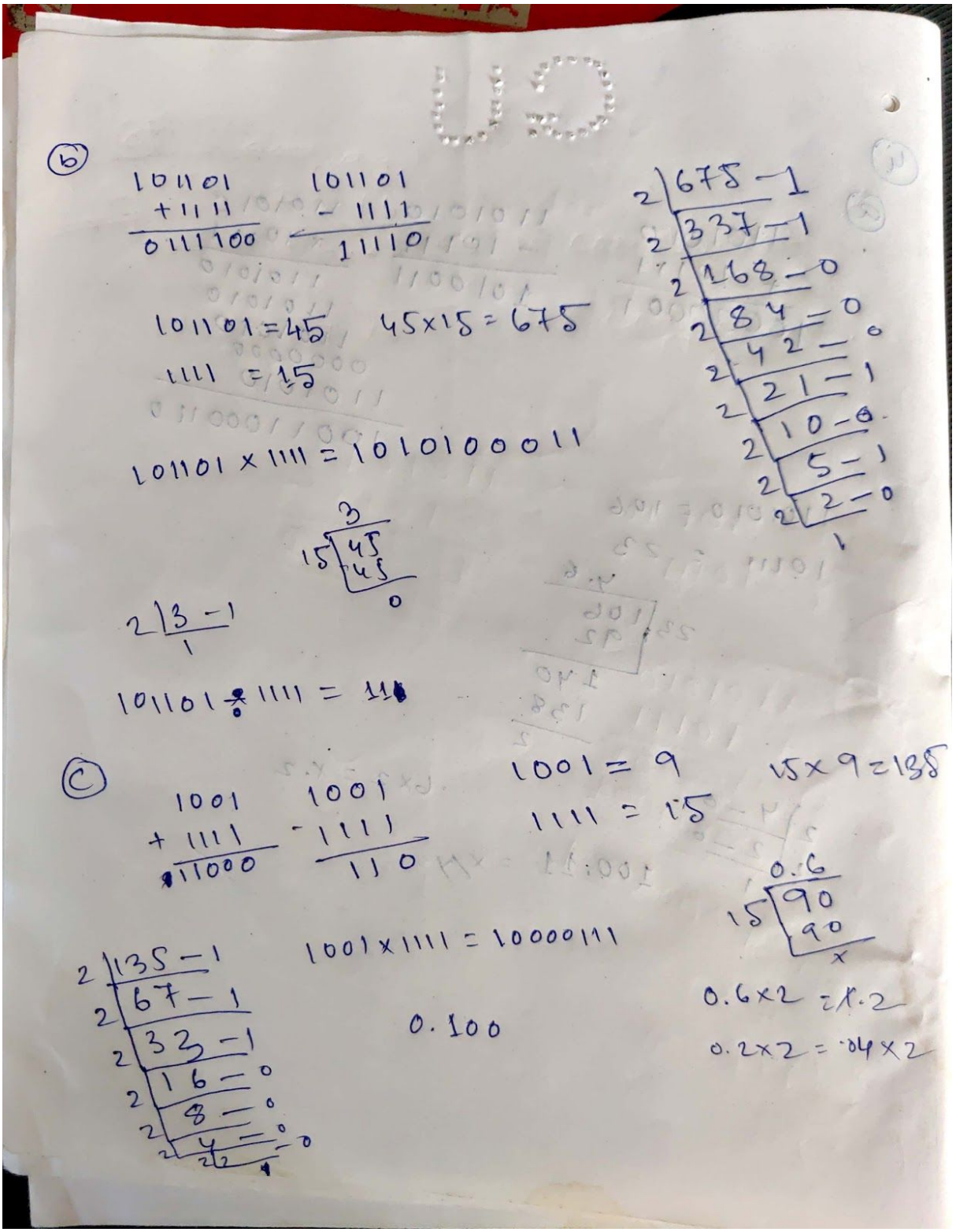
$(3FF.4)_{16}$

*Q4.Determine X + Y, X – Y, X * Y, and X/Y in each of the following sets of binary numbers:*

(a) X=1101010 (b) X=101101 (c) X= 1001

Y=10111 Y= 1111 Y= 1111





Q5.Find the 9s and 10s complement of the following decimal numbers:

(a) 465 (b) 09867 (c) 42678 (d) 8976 (e) 423.76

5.

(a)

```
  999
- 465
-------
  534   ← 9's comp.
+   1
-------
  535   → 10's compliment.
```

(b)

```
  99999
- 09867
-------
  90132  → 9's Compliment
+     1
-------
  90133  → 10's compliment.
```

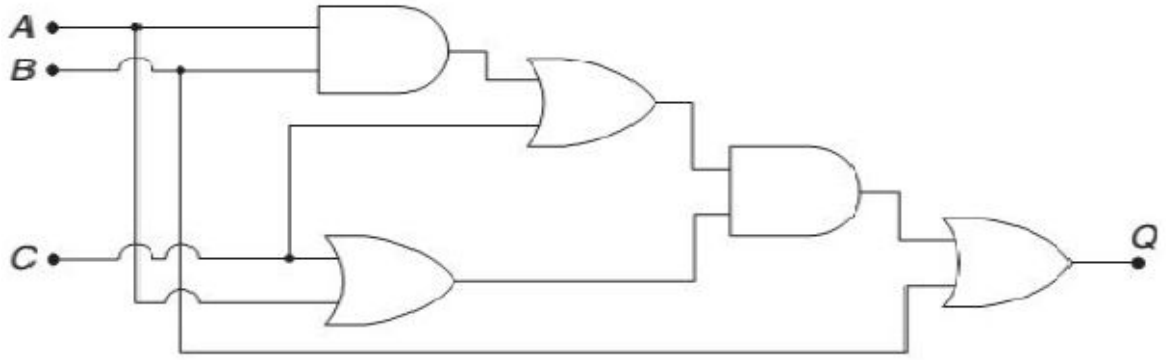
(c)

```
  99999
- 42678
-------
  57321  → 9's compliment.
+     1
-------
  57322  → 10's compliment.
```

(d)

```
  999.99
- 423.76
--------
  576.23  → 9's compliment
+     1
--------
  577.23  → 10's compliment.
```

Q6.Determine the output expression for the following circuit and simplify it using algebraic Manipulations.



Answer:-

Q =(AB+C)(A+C)+B

=AB+AC+ABC+C+B

=B(AC+1)+AB+C(A+1)

=B+AB+C

=B(A+1)+C

=B+C

I.e. Q=B+C