COMSATS University Islamabad, Lahore Campus

Assignment 1– FALL 2020

Course Title:	Microprocessor and Assembly Language				Course Code:	CSC321	Credit Hours: 3(2,1)
Course Instructor/s:	Sheeza Zaheer				Programme Name:	BCS	
Semester:	4	Batch:	SP19	Section:	A, B, C	Date:	10/06/2020
Deadline:	**10/6/2020**				**Maximum Marks:**		**25**
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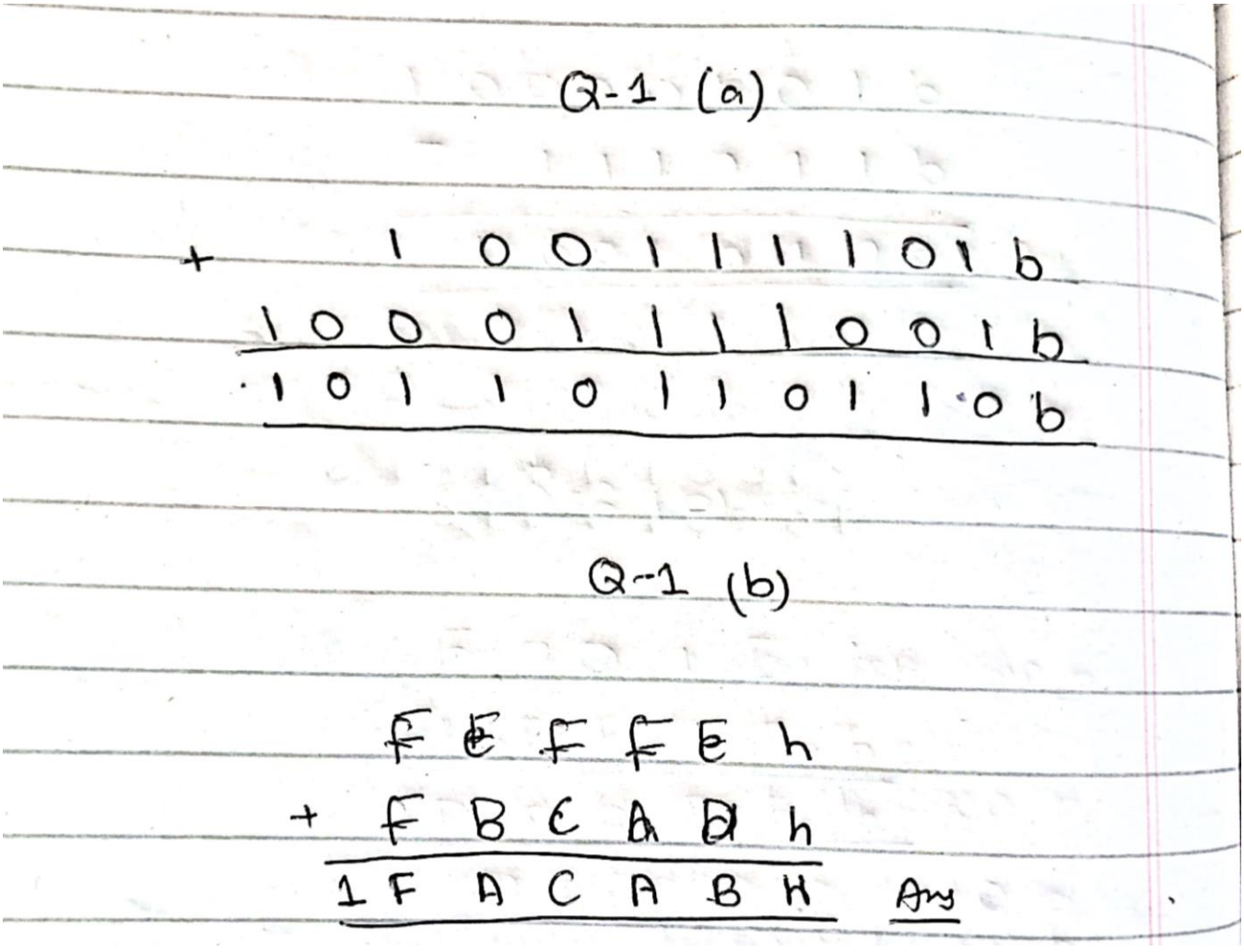
Important Instructions / Guidelines:

- Be precise and to the point while answering any question.
- Show all immediate steps. Every step carries individual mark.
- **Cheating will result in negative marking and even worse. Stay honest.**

Question no 1: Perform the following additions: **[Marks: 1.5 + 1.5 = 3]**

a) 100111101b + 10001111001b

b) FEFFEh + FBCADh



Question no 2: Perform the following subtractions: **[Marks: 1.5 + 1.5 = 3]**

a) 10000101b – 111011b

b) F001Eh – 1FF3Fh

Q-2 (a)

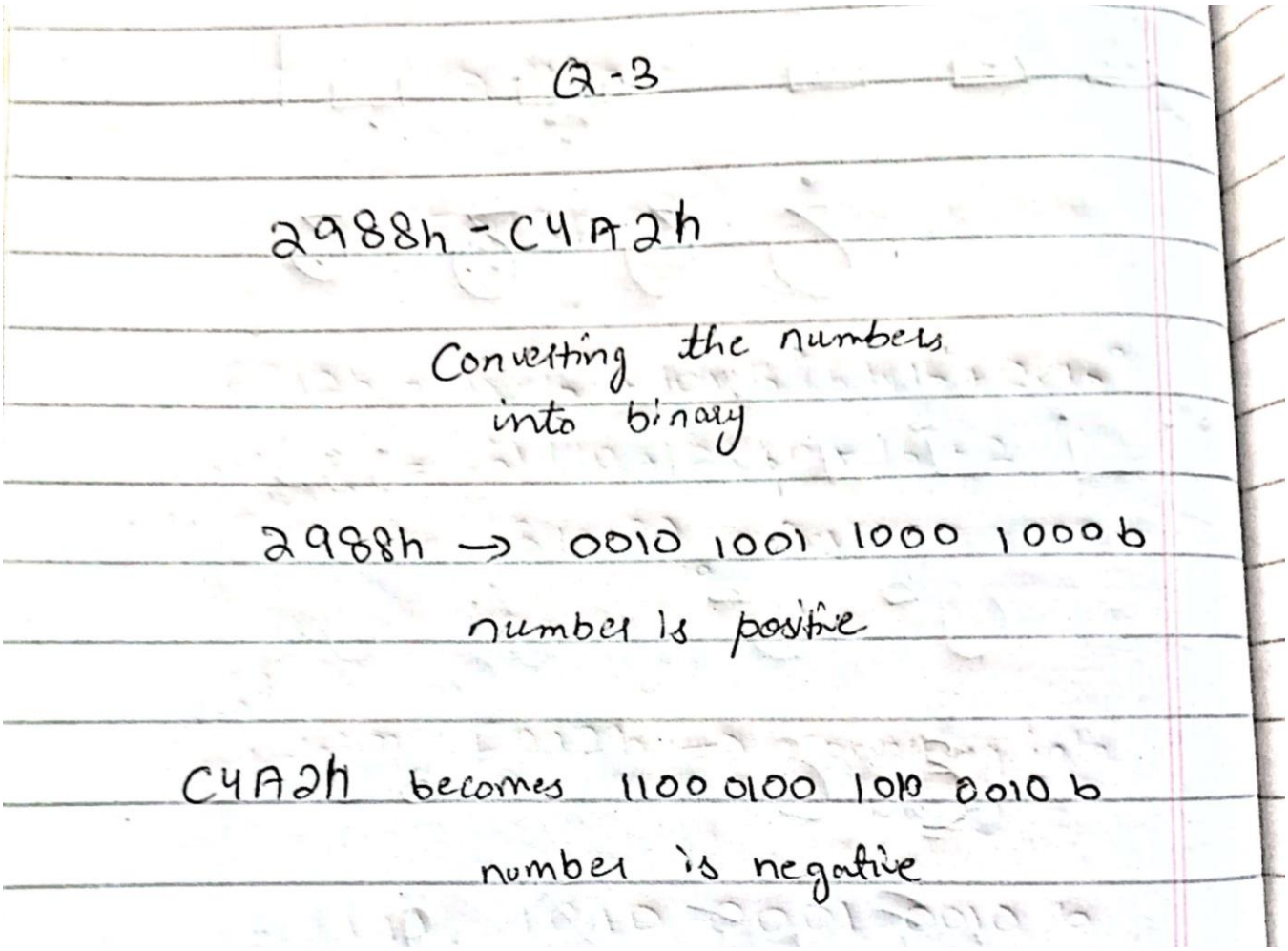
$$\begin{array}{r} {}^{0}{}^{1}{}^{1}{}^{1}{}^{1}{}^{0}{}^{1} \\ 1\ 0\ 0\ 0\ 0\ 1\ 0\ 1\ b \\ -\quad 1\ 1\ 1\ 0\ 1\ 1\ b \\ \hline 1\ 0\ 0\ 1\ 0\ 1\ 0\ b \end{array}$$ Ans

Q-2 (b)

$$\begin{array}{r} F\ 0\ 0\ 1\ E\ h \\ -\ 1\ F\ F\ 3\ F\ h \\ \hline D\ 0\ 0\ D\ F\ h \end{array}$$ Ans

Question no 3: Do the following binary and hex subtractions by two's complement addition.
[Marks: 5]

a) 2988h – C4A2h



1 1 0 0 0 1 0 0 1 0 1 0 0 0 1 0 b

1's 0 0 1 0 1 0 0 1 1 0 0 0 1 0 0 0 b

2's 1

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

Adding

0 0 1 0 1 0 0 1 + 1 0 0 0 1 0 0 0 b

0 0 1 1 1 0 1 1 0 1 0 1 1 1 1 0 b

0 1 1 0 0 1 0 0 1 1 0 0 0 1 1 0 b (Ans)

Question no 4: Give the unsigned and signed decimal interpretations of each of the following numbers.
[Marks: 3 + 3 = 6]

a) FA12h
b) 2AB4h

Q-4 (a)

FA12h

$FA12h = 15 \times 16^3 + 10 \times 16^2 + 1 \times 16^1 + 2 \times 16^0$

unsigned interpretation $= 61440 + 2560 + 16 + 2$

$= (64018)_{10}$ Ans

signed interpretation FA12h ⇒ converting into binary

1111 1010 0001 0010 b

number is negative

So, we take 2's complement

1111 1010 0001 0010 b

1's 0000 0101 1110 1101 b

2's + 1

0000 0101 1110 1110

Now Binary to Decimals

0000 0101 1110 1110b

$= 0 \times 2^9 + 1 \times 2^8 + 1 \times 2^7 +$
$1 \times 2^6 + 1 \times 2^5 + 0 + 1 \times 2^3 + 2^2$
$+ 2^1 + 0$

$= 0 + 0 + 0 + 0 + 0 + 1024 + 0$
$+ 256 + 128 + 64 + 32 + 0$
$+ 8 + 4 + 2$

$= (4518)_{10}$ Ans

Q-4 (b)

$2AB4h = 2\times16^3 + 10\times16^2 + 11\times16 + 16^0$

unsigned interpretation

$= 8192 + 2560 + 180$

$= (10932)_{10}$

Convert into binary

2A B4 h

0010 1010 1011 0100 b

number is +ve

no 2's complement

$= 2\times16^3 + 10\times16^2 + 16 + 4\times16^0$

$= 8192 + 2560 + 180$

$(10932)_{10}$ Ans

Question no 5: Show how the decimal integer -149 would be represented

[Marks: 3 + 3 = 6]

a) In 16 bits.
b) In 8 bits.

Q-5

-149 would be represented

a) In 16 bits

149 = 0000000010010101
1's C 1111111101101010
2's C 1
1111111101101011

= 1111111101101011 b

b) 8-bits

149 = 10010101 b
1's C 01101010 b
2's C 1
01101011 b Ans

Question no 6: Translate the following secret message, which has been encoded in ASCII as:
41 4C 4C 41 48 20 49 53 20 47 52 45 41 54 **[Marks: 2]**

Q-6

41 4C 4C 41 48 20 49 53 20 47 52 45 41 54

Encoded secret message

is

Allah is Great