Q: Are all of these enough to get full marks in the exam?

A: NO. This is a practice sheet. Meaning, you can practice all you want using the questions from this sheet. However, doing well in exams depends upon your ability to understand a question, formulate an answer, and express it correctly. You see, these are humane skills which cannot be guaranteed by completing a practice sheet only. But yeah, Best of luck anyway.

Chapter 3 (Arithmetic for Computers)

Question - 1:

Normalize the following numbers:

	Given Number	Normalized Number
i.	0.0000124678_{10}	1.24678x10^-5
ii.	$1584.234_{10} \times 10^5$	1.584234x10^8
iii.	4782.2354_{10}	4.7822354x10^3
iv.	110101.1111_2	1.101011111x2^5
v.	0.001100_2	1.100x2^-3
vi.	$1101.1111_2 \times 2^5$	1.1011111x2^8

Question - 2:

Find the Biased Exponent of 1.1011×2^{34} in IEEE-754 single precision format.

Bias exponent = 34+127 = 161

Question - 3:

Find the Biased Exponent of 1.1011×2^4 in 12-bit IEEE-754 format where the size of the exponent field is 4 bits.

Bias = 2^(4-1) - 1 = 7

Bias exponent = 4+ 7 = 11

Question - 4:

Find the Biased Exponent of 1.1011×2^{34} in 64-bit IEEE-754 format.

Bias exponent = 34 + 1023 = 1057

Question - 5:

Find the Biased Exponent of 5678.898 in 34-bit IEEE-754 format where the size of the exponent field is 10 bits.

Question - 6:

Convert -0.00987_{10} in 34-bit IEEE-754 floating point representation where the size of the fraction field is 23 bits.

sign bit	exponent	fraction

Question - 7:

Convert $1101.1111_2 \times 2^5$ in 32-bit IEEE-754 floating point representation.

Question - 8:

Convert $1101.1111_2 \times 2^{212}$ in 64-bit IEEE-754 floating point representation. Consider 10 decimal digits when you are converting from decimal to binary.

Question - 9:

Convert the following IEEE-754 single-precision floating point numbers into decimal.

	Given Numbers	Decimal Representation
i.	0xFF1205BA	
ii.	3457890989_{10}	
iii.	23245613451_8	

Question - 10:

Multiply the given numbers using IEEE-754 single-precision floating-point representation. Check if the result has overflow or underflow.

Note: Consider 10 decimal digits while converting from decimal to binary for the following questions.

	Given Numbers	Result	Overflow/ Underflow
i.	7.01_{10} and 0.71_{10}		
ii.	0.000101_2 and 10.1_2		
iii.	$0.000101_2 \times 2^{70}$ and $10010.000101_2 \times 2^{60}$		
iv.	1584.234_{10} and 1584.234_{10}		
v.	0.001100_2		
vi.	$1101.1111_2 \times 2^5$ and $110.000101_2 \times 2^6$		

Question - 11:

Multiply the given numbers using IEEE-754 double-precision floating-point representation. Check if the result has overflow or underflow.

Note: Consider 10 decimal digits while converting from decimal to binary for the following questions.

	Given Numbers	Result	Overflow/ Underflow
i.	7.01_{10} and 0.71_{10}		
ii.	$0.000101_2 \times 2^{-850}$ and $10.1_2 \times 2^{-900}$		
iii.	$0.0101_2 \times 2^{790}$ and $10010.0101_2 \times 2^{680}$		

Question - 12:

Multiply the given numbers using 18 bit IEEE-754 floating-point representation where the size of the fraction field is 12 bits. Check if the result has overflow or underflow.
Note: Consider 10 decimal digits while converting from decimal to binary for the following questions.

	Given Numbers	Result	Overflow/ Underflow
i.	7.01_{10} and 0.71_{10}		
ii.	$0.000101_2 \times 2^{-85}$ and $10.1_2 \times 2^{-90}$		
iii.	$0.0101_2 \times 2^{79}$ and $10010.0101_2 \times 2^{68}$		

Question - 13:

Add the 7.01_{10} and 0.71_{10} using IEEE-754 single-precision floating-point representation. Check if the result has overflow or underflow.

Note: Consider 10 decimal digits while converting from decimal to binary for the following questions.

Question - 14:

Subtract 7.01_{10} from 18.71_{10} using IEEE-754 single-precision floating-point representation. Check if the result has overflow or underflow.

Note: Consider 10 decimal digits while converting from decimal to binary for the following questions.

Question - 15:

Subtract -7.01_{10} from 18.71_{10} using IEEE-754 single-precision floating-point representation. Check if the result has overflow or underflow.

Note: Consider 10 decimal digits while converting from decimal to binary for the following questions.