

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.	$0.0000124678_{10}$	
ii.	$1584.234_{10} \times 10^5$	
iii.	$4782.2354_{10}$	
iv.	$110101.1111_2$	
v.	$0.001100_2$	
vi.	$1101.1111_2 \times 2^5$	

#### **Question - 2:**

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

#### **Question - 3:**

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

**Question - 4:**

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

**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.