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. | 0.000012467810 |  |
| ii. | 1584.23410 x 105 |  |
| iii. | 4782.235410 |  |
| iv. | 110101.11112 |  |
| v. | 0.0011002 |  |
| vi. | 1101.11112 x 25 |  |

## **Question - 2:**

Find the Biased Exponent of 1.1011 x 234 in IEEE-754 single precision format.

## **Question - 3:**

Find the Biased Exponent of 1.1011 x 24 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 x 234 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 -0.0098710 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 1101.11112 x 25 in 32-bit IEEE-754 floating point representation.

## **Question - 8:**

Convert 1101.11112 x 2212 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. | 345789098910 |  |
| iii. | 232456134518 |  |

## **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. | 7.0110 and 0.7110 |  |  |
| ii. | 0.0001012 and 10.12 |  |  |
| iii. | 0.0001012 x 270 and 10010.0001012 x 260 |  |  |
| iv. | 1584.23410 and 1584.23410 |  |  |
| v. | 0.0011002 |  |  |
| vi. | 1101.11112 x 25and 110.0001012 x 26 |  |  |

## **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. | 7.0110 and 0.7110 |  |  |
| ii. | 0.0001012 x 2-850 and 10.12 x 2-900 |  |  |
| iii. | 0.01012 x 2790 and 10010.01012 x 2680 |  |  |

## **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. | 7.0110 and 0.7110 |  |  |
| ii. | 0.0001012 x 2-85 and 10.12 x 2-90 |  |  |
| iii. | 0.01012 x 279 and 10010.01012 x 268 |  |  |

## **Question - 13:**

Add the 7.0110 and 0.7110 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 7.0110 from 18.7110 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 -7.0110 from 18.7110 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.