EXAMINATION INSTRUCTIONS

* Do not turn this page until asked to do so.
* Exam time is **30** minutes.
* Put the answers on the same question sheet, do not use any additional papers, even for scratch.
* Write your name, ID, section no. in the indicated places.
* Read the exam instructions.
* Read the honesty policy.
* Sign the following statement.

**Academic Integrity Policy**
Cheating in Exams is a violation of the Academic Integrity policy of AUC. Whispering, talking, looking at someone else’s paper, or copying from any source is considered cheating. Any one who does any of these actions or her/his answers indicates that she/he did any of them, will receive a punishment ranging from zero in this exam to failing the course. If repeated, it may lead to dismissal from AUC.

**I have read the honesty policy and exam instructions and I am presenting this exam as entirely my effort.**

Signature: ____________

DO NOT USE THIS SECTION

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<tr>
<th>Question</th>
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**Question 1 (15 points)**
Trace the following C++ program; i.e., show the effect of each numbered statement using the given table.

```c++
#include <iostream>
#include <cmath>
using namespace std;

void main () {
    float a = 4.5, b = 1.0, c;
    int x = 6, y = 2.5, z, s, t;
    // statement 1
    z = (x + y) / x * a; // statement 2
    c = y % x + sqrt(b) * a; // statement 3
    t = y / x * a;
    if (z != 1)
        s = pow(y, x) / (2 * b); // statement 5
    else
        s = pow(x, y) / (2 * b); // statement 6
    cout << "z = " << z << endl; // statement 7
    cout << "c = " << c << endl; // statement 8
    cout << "s = " << s << endl; // statement 9
    cout << "t = " << t << endl; // statement 10
}
```

Use the following table to trace the given program (i.e., to plot the value of different variables as instructions are executed one after the other and finally showing the output).

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<tr>
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Question 2 (5 points)
Draw the evaluation tree for the following expression:

$$t = z - \left( a + \frac{b}{2} \right) + x * -y$$
Question 3 (15 points)
a- Subtract 33 from 19 using 8-bit two’s complement computation.

b- Perform the following conversion operations to the number systems indicated:

\[(11100000011101101)_2 = (\quad)_8 = (\quad)_16\]

\[(1101)_10 = (\quad)_2 = (\quad)_16\]
Question 4 (15 points)
Tick only one possible answer for each of the following:

1) The software that controls and manages the computer resources is:
   a. Source program [ ]
   b. Loader [ ]
   c. Web browser [ ]
   d. Operating system [ ]

2) The smallest integer number that can be stored in 8-bit unsigned format is:
   a. -0 [ ]
   b. -128 [ ]
   c. 127 [ ]
   d. none of the above [ ]

3) The part of the computer that temporarily stores programs and data to be processed is:
   a. The CPU [ ]
   b. ROM [ ]
   c. RAM [ ]
   d. ALU [ ]

4) An algorithm is:
   a. An Operating System [ ]
   b. High-level programming language [ ]
   c. A list of steps for solving a problem [ ]
   d. A list of instructions that a computer executes to perform a task [ ]

5) A web browser is:
   a. A part of the operating system controls a user’s interaction with the web [ ]
   b. A graphical user interface that allows users to navigate through the web [ ]
   c. A software that enables users to edit web pages [ ]
   d. A computer that provides resources to other computers in a network [ ]

6) Von Neumann architecture is:
   a. A stored-program computer [ ]
   b. A web browser [ ]
   c. An architecture for RAM [ ]
   d. All the above [ ]

7) Computer virus is:
   a. Violation of copyright agreements [ ]
   b. Code disrupting the computer operations and erasing information [ ]
   c. A Computer theft or computer fraud [ ]
   d. A biological disease causing malfunctioning of the computer [ ]

8) In binary: 1001 + 11101 = ?
   a. 101000 [ ]
   b. 100110 [ ]
   c. 110110 [ ]
   d. none of the above [ ]

9) Summing up all even integers is a nonalgorithmic problem, because:
   a. It’s too difficult to compute [ ]
   b. It involves infinite number of operations without termination [ ]
   c. No machine can do it [ ]
   d. The algorithm to do it will very long [ ]

10) To address a memory of 256 Mbytes, the address bus should be:
    a. 18 bits [ ]
    b. 28 bits [ ]
    c. 128 bits [ ]
    d. None of the above [ ]

Good Luck