

**University of Swaziland**  
**Faculty of Science**  
**Department of Computer Science**  
**Supplementary Examination, 2006**

Title of Paper: Computer Organisation II

Course Number: CS341

Time Allowed: Three (3) hours

Instruction: Answer all questions. Questions carry equal marks.

You are reminded that in assessing your work, account will be taken of the accuracy of the material, of the language used and the general quality of expression, together with the layout and presentation of your answer. Remember full answers will usually *define, explain and exemplify*.

Special Requirement:

Calculators are prohibited.

This examination paper should not be opened until permission has been granted by the invigilator.

Question 1.

The following is the opcode table used by an assembler. If an opcode has an operand, there is only one and its type is relative (\*) or absolute (+)

| opcode | hex code | address type | length of address (bytes) |
|--------|----------|--------------|---------------------------|
| LDA    | C0       | *            | 1                         |
| GO     | 10       | +            | 1                         |
| JMP    | 10       | *            | 1                         |
| STOP   | 0        |              |                           |

Construct the symbol table for this program snippet, where the symbols have the conventional meanings, as introduced in the course:

```

                ENT      hello,world
hello          *EXT     printf
                LDA     data1
                STOR    data2
                printf
world          LDA     data2
                printf
                stop
data1          NUM     1
data2          NUM     2
    
```

Question 2.

a) Convert to reverse polish the following expression:

$(a + b) / [c - d]$

b) Evaluate the following reverse polish expression, where each number is one (decimal) digit:  
 $825*+132*+4-/$

c) Evaluate  $111_{10} + 111_{16} + 333_8$ . (Any of the number bases in the expression is acceptable for the answer.)

d) At a Unix system prompt, you type:

`umask 0234`

What is the result of typing

`umask -S`

afterwards?

e) You create a file called *X.log.1*. You are in groups *A* and *B*. You wish to allow users in group *B* to only read from this file, everybody else can only write to it. You will give yourself no access at all. What commands must be used when you assume no information about the file except its name?

**Question 3.**

- (a) Explain the six stage pipeline of the picoJavaII.
- (b) What data flows along the pipeline?

**Question 4.**

There are nine instruction formats defined by JVM. Choose four of them, and explain them in detail, giving an example of each.

**Question 5.**

- (a) The only sensible approach to the solution of the Towers of Hanoi problem is recursive. Explain this approach.
- (b) Give another example of the recursive paradigm.

**Question 6.**

- (a) Explain the three I/O methods commonly encountered in computers.
- (b) You are specifying the requirements for a computer that will work in a real-time situation which demands a quick response to external events. Which of the approaches in (a) would you choose, and why?

**Question 7.**

Describe in detail the steps in writing an applet to run in a web page.

End of examination paper.