UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

MAIN EXAMINATION, *2014*

Title of Paper   :   **Operating Systems**

Course Number   :   **CS 442**

Time Allowed   :   **Three (3) Hours**

Instruction   :   **Answer any FIVE questions**

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

1.

a) Describe the two main functions of an operating system, and elaborate on the importance of these functions. [12]

b) Describe the *three state process model*, describe what transitions are valid between the three states, and describe an event that might cause such a transition. [8]

2.

a) Multi-programming enables more than a single process to apparently execute simultaneously. How is this achieved on a uni-processor? [8]

b) What is a process? Describe its attributes. [4]

c) Describe the *ready queue* and discuss its function. [8]

3.

a) Discuss the different interrupt types that occur on processes. [10]

b) What is the function of the kernel in handling process interrupts? [10]

4. Discuss two advantages and three disadvantages of user-level threads [20]

5.

a) Describe the process of context switching. [5]

b) What is a race condition? Give an example. [8]

c) Describe starvation. [7]

6.

a) Give an example of a deadlock in an engineering company/machinery. [5]

b) Spooling can result in a deadlock if not managed well. Describe two ways in which you could minimize deadlocks in a spooling system paying attention to the advantages and disadvantages of each solution. [7]

c) Discuss the necessary conditions for a deadlock. [8]