****

**SOUTH EASTERN KENYA UNIVERSITY**

**UNIVERSITY EXAMINATIONS 2013/2014**

**SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE)**

**CSC 223: OPERATING SYSTEMS**

**DATE: 17Th/12/2013 TIME: (2 HOURS)**

**INSTRUCTIONS TO CANDIDATES**

1. ***Section A(Compulsory)***
2. ***Answer ANY TWO questions from section B***

**SECTION A (30 Marks) - Compulsory**

**Question One**

1. Explain the following as used in operating systems:
2. Virtual memory;
3. Seek time;
4. Thrashing. **(3 marks)**
5. Using an illustration, explain how Banker’s algorithm handles deadlocks.

**(4 marks)**

1. The table below shows four processes and their CPU burst times.

Process Arrival Time cpu Burst

P1 0 20

P2 1 5

P3 2 15

P4 3 10

1. Draw a Gantt chart to represent the execution of the processes using the round robin scheduling algorithm (use time slice of 4 units ) **(4 marks)**
2. Calculate the average waiting time for the above processes. **(2 marks)**
3. Direct memory access is used to enhance the performance of a computer .Using a diagram describe how this is achieved in an input /output operation. **( 5 marks)**
4. Suppose that a disk drive has 200 tracks numbered 0 through 199. The drive is currently servicing a request at tracks50 and the previous request was at track 47. The queue of pending requests is: 95, 180, 34, 119, 11, 123, 62, and 64in that order. Starting from the current head position determine the total distance that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms.
5. Shortest Seek-Time First(SSTF) **(3 marks)**
6. SCAN **(3 marks)**
7. Describe two file allocation methods. **(2marks)**
8. Differentiate between paging and segmentation memory allocation schemes. **(4 marks)**

**SECTION B (40 Marks): Answer Any Two Questions**

**Question Two**

1. Describe the following types of operating systems stating the most appropriate application areas.
2. Time-sharing systems
3. Batch processing systems
4. Distributed systems
5. Real-time systems **(8 marks)**
6. An operating system contains 3 resource classes (R1,R2, R3). The number of resource units in these classes is 7, 7 and 10 respectively. The current resource allocation state is shown below:

Allocated resources Maximum requirements

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | R1 | R2 | R3 |  | R1 | R2 | R3 |
| P1 | 2 | 2 | 3 |  | 3 | 6 | 8 |
| P2 | 2 | 0 | 3 |  | 4 | 3 | 3 |
| P3 | 1 | 2 | 4 |  | 3 | 4 | 4 |

1. Comment on the current state. **(3 marks)**
2. Determine whether request made by process P1 (1, 1, 0) can be granted. **(3 marks)**
3. With the aid of a diagram, describe the layered approach tooperating systemdesign.

**(6 marks)**

**Question Three**

1. Explain the following terms as used in operating systems:
2. Race condition
3. Semaphore **(4 marks)**
4. Describe four conditions that must be sufficient in order for deadlock to occur.

**(8 marks)**

1. With the aid of a diagram, explain the five-state process model. **(8 marks)**

**Question Four**

1. Describe four goals of input/output software. **(8 marks)**
2. Explain the producer consumer problem as an approach to mutual exclusion**.(6 marks)**
3. Differentiate between the following:  **(6 marks)**
4. Sequential and direct file access methods
5. Turnaround time and Throughput
6. Character devices and Block devices