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**University Examinations 2016/2017**

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF

BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND FORENSICS

**CCF 3302: OPERATING SYSTEMS DESIGN**

**DATE: DECEMBER 2016 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two***questions.

**QUESTION ONE (30 MARKS)**

1. Differentiate between a long term scheduler and a short term scheduler, CPU processes

(2 marks)

1. Using examples and illustrations, distinguish between single processor systems and multi-processor systems (4 marks)
2. Demonstrate the design of a microkernel (4 marks)
3. Differentiate between cooperating and independent processes (4 marks)
4. Explain how a process may respond to a signal (4 marks)
5. Describe the following terms as used in operating systems (6 marks)
6. System call
7. Programming API
8. Layering
9. Give a function prototype to perform the following tasks, discuss each parameter
10. Create a socket (3 marks)
11. Perform operation on message queue (3 marks)

**QUESTION TWO (20 MARKS)**

1. Describe any two types of threaded systems (4 marks)
2. Briefly describe the following memory management schemes (4 marks)
3. Dynamic partition
4. Segmented memory
5. Define the following terms: (6 marks)
6. Device Controller
7. Device interface
8. Buffered IO
9. Briefly explain how a DMA controller operates (6 marks)

**QUESTION THREE (20 MARKS)**

1. Using suitable illustration, describe the various layers that define an operating system (4 marks)
2. Differentiate between the following (6 marks)
3. File direct and sequential access.
4. Contiguous and linked allocation.
5. File attribute and file operation mode.
6. Write a program which maliciously access file named student.txt and clear all existing content and replace it with your nickname. Explain the working of your program. (10 marks)

**QUESTION FOUR (20 MARKS)**

1. What is runtime environment (RTE)? Give tow examples (2 marks)
2. Differentiate between a trap and a deadlock (4 marks)
3. Discuss four reasons for use of multithreading systems (4 marks)
4. In context of process execution explain what is meant by system call and context switch and provide examples. (4 marks)
5. The OS manages the life cycle of a process generally there in 3 main steps: Creating, managing and terminating the process. Explain the step details and interaction that take place (6 marks)

**QUESTION FIVE (20 MARKS)**

1. During process execution a parent process may terminate the execution of one of its child processes, explain the circumstances under which the parent can take such an action. (6 marks)
2. Using a suitable illustration demonstrate how a user application invoking the open ( ) system call can be implemented on system call interface API. (6 marks)
3. Describe four operations that can be performed on a File (8 marks)