Code No: RT31055 **R13** SET - 1

III B. Tech I Semester Regular Examinations, November - 2015

OPERATING SYSTEMS

(Common to CSE and IT)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Define Operating System. List the objectives of an operating system.	[3M]
	b)	With a neat diagram, explain various states of a process.	[4M]
	c)	Give the Peterson's solution to the Critical section problem.	[4M]
	d)	Distinguish between Logical and Physical address space.	[3M]
	e)	What are the necessary conditions for the occurrence of deadlock?	[4M]
	f)	What are the various attributes that are associated with an opened file?	[4M]

PART –B

2	a)	With a neat diagram, explain the layered structure of UNIX operating system.	[8M]
	b)	What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices?	[8M]
3	a)	What is a process? Explain about various fields of Process Control Block.	[8M]
	b)	What are the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain.	[8M]
4	a)	What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy.	[8M]
	b)	What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors.	[8M]
5	a)	What is a Virtual Memory? Discuss the benefits of virtual memory technique.	[8M]
	b)	What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem?	[8M]
6	a)	What is a deadlock? How deadlocks are detected?	[8M]
	b)	Explain the Resource-Allocation-Graph algorithm for deadlock avoidance.	[8M]
7	a)	Briefly explain about single-level, two-level and Tree-Structured directories.	[8M]
	b)	Explain and compare the SCAN and C-SCAN disk scheduling algorithms.	[8M]

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Code No: RT31055 **R13** SET - 2

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3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain how multiprogramming increases the utilization of CPU.	[3M]
	b)	What are the advantages of inter-process communication? Also explain various implementations of inter-process communication.	[4M]
	c)	What is a Semaphore? Also give the operations for accessing semaphores.	[4M]
	d)	What is the purpose of Paging and Page tables?	[3M]
	e)	What are the various methods for handling deadlocks?	[4M]
	f)	Briefly explain the indexed allocation method.	[4M]

PART -B

2	a)	Explain the Dual-Mode operation of an operating system.	[8M]
	b)	Mention the objectives and functions of Real-Time Embedded systems.	[8M]
3	a)	With a neat sketch, explain the process state diagram.	[8M]
	b)	What are the criteria for evaluating the CPU scheduling algorithms? Why do we need it?	[8M]
4	a)	What is a semaphore? List the types of semaphores and Show that, if the wait() and signal() semaphore operations are not executed atomically, then mutual exclusion may be violated.	[10M]
	b)	Discuss the Bounded-Buffer problem.	[6M]
5	a)	What is a page fault? Explain the steps involved in handling a page fault with a neat sketch.	[8M]
	b)	Consider the following page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 How many page faults would occur for the optimal page replacement algorithm, assuming three frames and all frames are initially empty.	[8M]
6	a)	Write about deadlock conditions and bankers algorithm in detail.	[10M]
	b)	Discuss various techniques to recover from the deadlock.	[6M]
7	a)	Write in detail about file attributes, operations and types and structures.	[8M]
	b)	Explain in detail about various ways of accessing disk storage.	[8M]

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Code No: RT31055 **R13** SET - 3

III B. Tech I Semester Regular Examinations, November- 2015

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2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	What are the various security issues that arise in multiprogramming and time shared systems?	[3M]
	b)	Describe the differences among short-term, medium-term, and long-term scheduling.	[4M]
	c)	Briefly explain the Readers-Writers problem.	[4M]
	d)	What are the disadvantages of single contiguous memory allocation?	[3M]
	e)	Explain the various ways of aborting a process in order to eliminate deadlocks.	[4M]
	f)	What is the drawback of Network-attached storage systems?	[4M]

PART -B

2	a)	With a neat sketch, describe the services that an operating system provides to users, processes and other systems.	[8M]
	b)	Distinguish between client-server and peer-to-peer models of distributed systems.	[8M]
3	a)	Define a Thread? Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created?	[8M]
	b)	Explain the Round Robin scheduling algorithm with a suitable example.	[8M]
4	a)	State the Critical Section problem. Illustrate the software based solution to the Critical Section problem.	[8M]
	b)	How does the signal() operation associated with monitors differ from the corresponding operation defined for semaphores.	[8M]
5	a)	What are the disadvantages of single contiguous memory allocation? Explain.	[6M]
	b)	Discuss the hardware support required to support demand paging.	10M
6	a)	How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.	10M
	b)	Is it possible to have a deadlock involving only a single process? Explain.	[6M]
7	a)	Explain the various methods for free-space management.	10M
	b)	Discuss various issues involved in selecting appropriate disk scheduling algorithm.	[6M]

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Code No: RT31055 **R13** SET - 4

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2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain the importance of Real-Time Embedded systems.	[3M]
	b)	Define Thread. Write the differences between user-level and kernel-level threads.	[4M]
	c)	Define Monitor. Explain how it overcomes the drawback of semaphores.	[4M]
	d)	Explain how demand paging affects the performance of a computer system.	[4M]
	e)	Write about Resource-Allocation graph.	[4M]
	f)	Explain the bit vector representation of free space management.	[3M]

PART -B

2	a)	What is a System call? Explain the various types of system calls provided by an operating system.	[8M]
	b)	What is the purpose of interrupts? What are the differences between a trap and an interrupt? Can traps be generated by a user program? Explain the purpose with an example.	[8M]
3	a)	Distinguish between preemptive and non-preemptive scheduling. Explain each type with an example.	[8M]
	b)	Describe the actions taken by a thread library to context-switch between user-level threads.	[8M]
4	a)	What is synchronization? Explain how semaphores can be used to deal with n-process critical section problem.	[8M]
	b)	Discuss Mutual-exclusion implementation with test and set() instruction.	[8M]
5	a)	Explain the difference between External fragmentation and Internal fragmentation. How to solve the fragmentation problem using paging.	[8M]
	b)	Discuss various issued related to the allocation of frames to processes.	[8M]
6	a)	Discuss the necessary conditions that cause deadlock situation to occur.	[8M]
	b)	Discuss various methods for the prevention of deadlocks.	[8M]
7	a)	Explain the Indexed allocation of disk space.	[8M]
	b)	Explain and compare the FCFS and SSTF disk scheduling algorithms.	[8M]

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