Code No: RT31055 (R13)

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

SET - 1

(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**

PART -A

1	a)b)c)d)e)f)	Define Operating System. List the objectives of an operating system. With a neat diagram, explain various states of a process. Give the Peterson's solution to the Critical section problem. Distinguish between Logical and Physical address space. What are the necessary conditions for the occurrence of deadlock? What are the various attributes that are associated with an opened file?	[3M] [4M] [4M] [3M] [4M] [4M]
		<u>PART –B</u>	
2	a) b)	With a neat diagram, explain the layered structure of UNIX operating system. What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices?	[8M] [8M]
3	a) b)	What is a process? Explain about various fields of Process Control Block. What are the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain.	[8M] [8M]
4	a) b)	What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy. What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors.	[8M]
5	a) b)	What is a Virtual Memory? Discuss the benefits of virtual memory technique. 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] [8M]
6	a) b)	What is a deadlock? How deadlocks are detected? Explain the Resource-Allocation-Graph algorithm for deadlock avoidance.	[8M] [8M]
7	a) b)	Briefly explain about single-level, two-level and Tree-Structured directories. Explain and compare the SCAN and C-SCAN disk scheduling algorithms.	[8M] [8M]

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SET - 2

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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**

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]			
	<u>PART -B</u>					
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:	[8M]			
		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.				
6	a) b)	Write about deadlock conditions and bankers algorithm in detail. Discuss various techniques to recover from the deadlock.	[10M] [6M]			
7	a) b)	Write in detail about file attributes, operations and types and structures. Explain in detail about various ways of accessing disk storage.	[8M] [8M]			
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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

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) b)	What are the disadvantages of single contiguous memory allocation? Explain. Discuss the hardware support required to support demand paging.	[6M] 10M
6	a)	How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.	10 M
	b)	Is it possible to have a deadlock involving only a single process? Explain.	[6M]
7	a) b)	Explain the various methods for free-space management. Discuss various issues involved in selecting appropriate disk scheduling algorithm.	10M [6M]

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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**

PART -A

1	a) b)	Explain the importance of Real-Time Embedded systems. Define Thread. Write the differences between user-level and kernel-level threads.	[3M] [4M]
	c)d)e)f)	Define Monitor. Explain how it overcomes the drawback of semaphores. Explain how demand paging affects the performance of a computer system. Write about Resource-Allocation graph. Explain the bit vector representation of free space management.	[4M] [4M] [4M] [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) b)	Discuss the necessary conditions that cause deadlock situation to occur. Discuss various methods for the prevention of deadlocks.	[8M] [8M]
7	a) b)	Explain the Indexed allocation of disk space. Explain and compare the FCFS and SSTF disk scheduling algorithms.	[8M] [8M]

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