



Printed Pages : 4

CS – 403

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1031

Roll No.

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B. Tech.

(SEM. IV) EXAMINATION, 2006-07

OPERATING SYSTEM*Time : 3 Hours]**[Total Marks : 100**Note : Attempt all questions.***1 Attempt any two : 10×2**

- (a) Explain the terms: shell, kernel, thread, process.
- (b) Describe memory and system protection requirements in multiprogramming and time-sharing systems.
- (c) What are real time operating systems? How they are developed and implemented? Illustrate some applications where they can be used?

2 Attempt any two : 10×2

- (a) Give the principles, which should be followed by any solution designed to achieve mutual exclusion in critical section problem. Also, discuss how well these principles are followed in Dekker's solution.

V-1031]

1

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- (b) Critically evaluate the method of message passing as a means of Interprocess Communication. Justify your answer with respect to Producer-Consumer problem.
- (c) What do you understand by race-condition? Give few examples of arising of race-condition in concurrent processing.

3 Attempt any **two** : **10×2=20**

- (a) Suppose that the following processes arrive for execution at the time indicated:

<i>Process</i>	<i>Arrival Time</i>	<i>Burst Time</i>
P1	0	8
P2	1	4
P3	2	9
P4	3	5

What is the average waiting and turn-around time for these processes with:

- (i) FCFS scheduling algorithm.
 - (ii) Preemptive SJF algorithm.
 - (iii) Non preemptive SJF algorithm.
- (b) Describe the Banker's algorithm for safe allocation. Consider a system with three processes and three resource types and at time T_0 the following snapshot of the system has been taken:

Process	<i>Allocated</i>			<i>Maximum</i>			<i>Available</i>		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8	7	7	10
P2	2	0	3	4	3	3			
P3	1	2	4	3	4	4			

V-1031]

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- (i) Is the current allocation safe state?
- (ii) Would the following requests be granted in the current state?
 - (a) Process P2 requests (1,0)
 - (b) Process P1 requests (1,0)
- (c) (i) Discuss the design-issues related to multiprocessor scheduling
- (ii) What are the approaches that can be used for prevention of deadlock.

4 Attempt any **two** : **10×2**

- (a) (i) Explain the difference between internal fragmentation and external fragmentation. Which one occurs in Paging system? Which one occurs in systems using pure segmentation?
- (ii) What is thrashing? When does it occur? Explain
- (b) If FIFO page replacement is used with four page-frames and eight pages, how many page-faults will occur with the reference string 0 1 7 2 3 2 7 1 0 3 if the four frames are initially empty? Repeat this problem for LRV.
- (c) (i) Consider the following segment table

<i>Segment</i>	<i>Base</i>	<i>Length</i>
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

V-1031]

3

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What are the physical addresses for the following logical addresses?

- (a) 0, 430
- (b) 1, 12
- (c) 2, 500
- (d) 3, 400
- (e) 4, 110

(iii) Page size are kept in powers of 2. Why ?

5 Attempt any **two** : **10×2**

- (a) Discuss the influence of non-contiguous allocation of disk space on the feasibility and effectiveness of the fundamental file organizations.
- (b) Explain the security and protection provisions implemented in UNIX operating system.
- (c) Explain shortest-seek-time-first (SSTF) Disk scheduling. Why SSTF scheduling tends to favour middle cylinders over the inner most and outer most cylinders?
