

# END TERM EXAMINATION

FOURTH SEMESTER [B.TECH.] - MAY 2008

Course Code: ETCS212

Subject: Operating Systems  
(Batch: 2004-2006)

Course ID: 28212

Maximum Marks : 75

Duration: 3 Hours

Note: Attempt any five questions.

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- 1 (a) Explain the multi programming, time-sharing and distributed operating system. (6)
  - (b) Distinguish between kernel and micro-kernel of an operating system. Describe the essential modules of kernel and explain the purpose of system calls. (9)
  - 2 (a) Explain the following terms with the help of examples: - (6)
    - (i) Race-condition
    - (ii) Critical section
    - (iii) mutual exclusion with busy waiting
  - (b) Explain the reader's and writer's classical IPC problem and its solution. (9)
  - 3 (a) What is CPU scheduling? Explain the long-term, medium-term and short-term scheduling. (6)
  - (b) Given the following information: - (9)

Process	Arrival time	Burst time	Priority
A	0	3	3
B	1	6	5
C	2	1	2
D	3	4	1
E	4	2	4

Compute average waiting time and average turnaround time for the following scheduling algorithms: -

- (i) Round-Robin (Quantum = 1)
- (ii) Priority preemptive
- (iii) Preemptive SJF

- Q.4 (a) Describe Banker's algorithm to avoid a deadlock. (7)
- (b) Consider a system with five processes (P0, P1, P2, P3, P4) and three resources types (A, B, C) and having the following snapshot: (8)

	Allocation			Max.			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Find

- (i) Is system in a safe state?
- (ii) Suppose process P1 requests one additional instance of resource type A and two instances of resource type C. Can request be immediately granted?

- Q.5 (a) Explain in details: - (9)
- (i) Paged segmentation
  - (ii) Segmented paging
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- (b) In a paged segmented system, a virtual address consists of 32 bits, of which 12 bits are used for displacement, 11 bits are a segment number and 9 bits are a page number. Calculate (6)
- (i) Page size
  - (ii) Maximum number of pages
  - (iii) Maximum segment size
  - (iv) Maximum number of segments
- Q.6 (a) Describe various disk space allocation strategies with their merits and demerits. And discuss also the criteria that have to decide which strategy is to be adopted for a particular file. (8)
- (b) A disk drive has 50 cylinders, numbered 0 to 49. The drive is currently serving a request at cylinder 15, and the previous request was at cylinder 9. The queue of pending requests, in FIFO order is 4, 40, 11, 35, 7, 14. (7)
- (i) SSTF
  - (ii) SCAN
  - (iii) LOOK
  - (iv) C-SCAN
- Q.7 Write short notes (any three): - (3x5)
- (a) Direct memory access (DMA)
  - (b) File protection and security
  - (c) Semaphores
  - (d) Virtual memory
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