



ENGINEERING & MANAGEMENT EXAMINATIONS, DECEMBER - 2007
OPERATING SYSTEM & SYSTEMS SOFTWARE
SEMESTER - 3

Time : 3 Hours]

[Full Marks : 70

GROUP - A**(Multiple Choice Type Questions)**1. Choose the correct alternatives for the following : 10 × 1 = 10

i) Mutual exclusion problem occurs between

- a) two disjoint processes that do not interact
- b) processes that share resources
- c) processes that do not share resources
- d) none of these.

ii) Dirty bit is used to show the

- a) page with corrupted data
- b) the wrong page in the memory
- c) page that is modified after being loaded into cache memory
- d) page that is less frequently accessed.

iii) Memory protection is of no use in a

- a) single user system
- b) non-multiprogramming system
- c) non-multitasking system
- d) none of these.



- iv) Page fault occurs when
- a) the page is corrupted by application software
 - b) the page is in main memory
 - c) the page is not in main memory
 - d) one tries to divide a number by 0.
- v) Throughput is
- a) process that is completed per unit time
 - b) completion of the whole process
 - c) time for waiting in ready queue
 - d) waiting to get into memory.
- vi) Context switching is a
- a) part of spooling
 - b) part of polling
 - c) part of interrupt handling
 - d) part of interrupt servicing.
- vii) An address generated by the CPU is commonly referred to as
- a) logical address
 - b) physical address
 - c) relational address
 - d) virtual address.
- viii) System calls are usually invoked by
- a) a software interrupt
 - b) polling
 - c) an indirect jump
 - d) a privileged instruction.



- ix) Compaction is used to solve the problem of
- a) external fragmentation b) internal fragmentation
- c) both of these d) none of these.
- x) Which is not a page replacement algorithm ?
- a) LRU b) FIFO
- c) Round-Robin d) None of these.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following questions. 3 × 5 = 15

2. What is context switching ? State the steps that are taken for context switching between two processes. 1 + 4
3. Consider the following set of processes. CPU burst time of them are given below in milli-second.

Process	CPU Burst Time
P1	15
P2	5
P3	7
P4	10

Draw the Gantt Chart for R.R. scheduling where time quantum $q = 5$ millisecond.
Calculate the average waiting time. 5

4. What is demand paging ? What is the advantage of demand paging over the swapping ? 5
5. Explain the following : 5
- a) Paging & segmentation
- b) Swapping.
6. Differentiate between process and thread. 5

**GROUP - C****(Long Answer Type Questions)**Answer any *three* questions.

3 × 15 = 45

7. What is resource allocation graph ? How will deadlock be prevented ? Consider the following snapshot of a system :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker's algorithm :

- a) What is the content of the matrix need ?
- b) Is the system in a safe state ?
- c) If a request from P_1 arrives for (0, 4, 2, 0), can the request be granted immediately ? 3 + 4 + 2 + 3 + 3
8. a) What is Dining Philosopher's problem ? Describe an algorithm to solve the problem using semaphore.
- b) State and explain Banker's algorithm and its application in O.S. with a suitable example. 5 + 10
9. a) What is critical section problem ? What are the requirements that the solution to critical section problem must satisfy ?
- b) What is semaphore ? How is it accessed ? Explain the Dining Philosopher's problem and give the solution of it, using semaphore. 10 + 5
10. a) Explain the concept of overlay management system with diagram.
- b) What are co-operative processes and race condition ? Explain the solution of producer-consumer problem using semaphore. Explain the advantages of monitor.
- c) Consider the following sequence of memory reference for a 460 word program :
- 10, 11, 104, 170, 309, 185, 245, 246, 434, 458, 364.
- Give the reference string assuming a page size of 100 words. 4 + 7 + 4



11. What are the advantages and disadvantages of Assembly Language program ? Explain the functions pass 1 and pass 2 of two-pass Assembler. Why are nemonic table and symbol table both required in synthesis phase of a two-pass assembler ? What is debugging system ?

3 + 4 + 5 + 3

END

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