



**ENGINEERING & MANAGEMENT EXAMINATIONS, DECEMBER - 2008**  
**OPERATING SYSTEM**  
**SEMESTER - 5**

Time : 3 Hours ]

[ Full Marks : 70

**GROUP - A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for the following : 10 × 1 = 10

i) Which scheduling algorithm is inherently preemptive ?

- a) FCFS
- b) SJF
- c) RR
- d) Priority scheduling.

ii) Total time taken by a process to complete execution is

- a) waiting time
- b) turnaround time
- c) response time
- d) throughput.

iii) The time spent by a process in the ready queue is

- a) waiting time
- b) turnaround time
- c) response time
- d) throughput.

iv) The optimal scheduling algorithm is

- a) FCFS
- b) SJF
- c) RR
- d) None of these.

v) In DMA transfer

- a) CPU is involved actively during data transfer
- b) CPU is involved partially during data transfer
- c) DMA controller is actively involved during data transfer
- d) Both (b) and (c).

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vi) Find the average time in the Round Robin Scheduling for the following. Assume a time slice of 4 ms

Process CPU Time ( in ms)

P1 24

P2 3

P3 3

- a) 7
- b) 5.66
- c) 6.66
- d) none of these.

vii) Fixed partition memory allocation supports

- a) Multiprogramming
- b) Uniprogramming
- c) Both of these
- d) None of these.

viii) Variable partition memory allocation can lead to

- a) External fragmentation
- b) Internal fragmentation
- c) Both of these
- d) None of these.

ix) Virtual memory concept is supported by

- a) demand paging
- b) simple segmentation
- c) simple page allocation
- d) both (a) and (c).

x) Virtual memory means

- a) the job size is not bounded by the physical memory limit
- b) the job size is bounded by the physical memory limit
- c) independent of physical memory limit
- d) none of these.

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**GROUP - B**

**( Short Answer Type Questions )**

Answer any *three* of the following.

3 × 5 = 15

2. What are co-operating processes ? Discuss the advantages of co-operating processes. 5
3. What is a CPU scheduler ? Discuss in brief, the different types of schedulers. 2 + 3
4. Give details of how paging is implemented in hardware. Explain what is a Translation Lookaside Buffer ( TLB ) and give details of how it is implemented. 5
5. Distinguish between "starvation" and "deadlock". 5
6. What is the problem of fragmentation and how can it be solved ? 5

**GROUP - C**

**( Long Answer Type Questions )**

Answer any *three* of the following questions.

3 × 15 = 45

7. a) Explain what is Contiguous Allocation of file space on disk. What are the advantages and disadvantages of contiguous allocation ? 5  
b) Explain how a File Allocation Table ( FAT ) is implemented. 4  
c) Free disk space can be kept track of using a free list or a bit map. Disk addresses require D-bits. For a disk with B-blocks, F of which are free, state the condition under which the free list uses less space than the bit-map. For D having the value 16-bits. Express your answer as a percentage of the disk space that must be free. 6
8. a) What is swapping ? What is its purpose ? 3  
b) Consider the following sequence of memory references generated by a single program in a pure paging system :

10, 11, 104, 104, 170, 173, 177, 309, 245, 246, 247, 458, 364.



Determine the no. of page faults for each of the following page replacement policies assuming three ( 3 ) page frames are available and all are initially empty.

The size of a page is 100 words :

- i) LRU
- ii) FIFO
- iii) Optimal page replacement 4 + 4 + 4

9. a) What is Bankar's safety algorithm ?
- b) What are the necessary conditions for deadlock ?
- c) Consider the following snapshot of a system :

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

- i) What is the content of the need matrix ?
  - ii) Is the system in safe state ? ( If any safe state is present. )
  - iii) If a request from process P1 arrive for 0, 4, 2, 0, CAN the request be granted immediately ? 5 + 2 + 2 + 3 + 3
10. a) What is the difference between logical address and physical address ?
- b) What is fragmentation ? How is external fragmentation solved ? What is compaction ? What are the drawbacks of compaction ? 2 + 3 + 1 + 2



- c) What is effective memory access time ? A paging system with the table stored in the memory.
- i) If memory reference takes 200 ns, how long does a paged memory reference take ?
  - ii) If we add TLBs and 75% hit is successful, what is the effective memory reference time ? ( Assume that finding page-table entry in the TLBs take zero time, if the entry is there ).

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11. Write short notes on the following :

5 × 3

- a) Threads
- b) Priority Scheduling
- c) DMA and its utility
- d) Boot block and Bad block
- e) Thrashing.

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END