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).

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.

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).   7

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.

END